ATTACHMENT 14

Demilitarization Miscellaneous Treatment Units

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List of Acronyms

ACAMS	Automatic Continuous Air Monitoring System
ACS	Agent Collection System
AQS	Agent Quantification System
BDS	Bulk Drain Station
BRS	Burster Removal Station
BSRM	Burster Size Reduction Machine
CCTV	Closed Circuit Television
CHB	Container Handling Building
CON	Control Room
CSS	Conditioning and Settling System
CWC	Chemical Weapons Convention
DCD	Deseret Chemical Depot
DFS	Deactivation Furnace System
DS	Discharge/Output Station
DSHW	Division of Solid and Hazardous Waste
ECR	Explosive Containment Room
ECV	Explosive Containment Room Vestibule
FCC	Facility Construction Certification
HCl	Hydrochloric Acid
HVAC	Heating, Ventilation, and Air Conditioning System
IS	Infeed/Transfer Station
LIC	Liquid Incinerator
MDB	Munitions Demilitarization Building
MDM	Multipurpose Demilitarization Machine
MPF	Metal Parts Furnace
MPRS	Miscellaneous Parts Removal Station
NAAQS	National Ambient Air Quality Standards
NCRS	Nose Closure Removal Station
NO_x	Nitrogen Oxides
O_3	Ozone
ONC	Onsite Container
PHS	Projectile/Mortar Handling System
PLC	Programmable Logic Controller
PM_{10}	Particles Less Than 10 Microns in Aerodynamic Diameter
PMD	Projectile/Mortar Disassembly Machine
PPM	Pick and Place Machine
RCRA	Resource Conservation and Recovery Act
RDS	Rocket Drain Station
RSM	Rocket Shear Machine
RSS	Rocket Shear Station
SDS	Spent Decontamination System
SO_2	Sulfur Dioxide
TOCDF	Tooele Chemical Agent Disposal Facility
TSP	Total Suspended Particles
UPA	Unpack Area

14.1 Description of Miscellaneous Units

14.1.1 The miscellaneous units addressed in this attachment are:

14.1.1.1 Rocket Shear Machine (RSM), including the Rocket Drain Station (RDS) and the Rocket Shear Station (RSS)
14.1.1.2 Bulk Drain Station (BDS)
14.1.1.3 Projectile/Mortar Disassembly Machine (PMD), including the Multi-position Loader.
14.1.1.4 Multipurpose Demilitarization Machine (MDM), including the Pick and Place Machine.
14.1.1.5 Mine Machine.
14.1.1.6 Air Operated Remote Ordnance Access System (Cutter Machine)

14.1.2 These units do not fit the definition of a container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, or underground injection well. Therefore, these units are categorized as miscellaneous units. The miscellaneous treatment units listed above will be used to treat the following items:

14.1.2.1M55 rockets (RSM)
14.1.2.2Explosive components from munitions (RSM)
14.1.2.3MK-116 Weteye bombs (BDS)
14.1.2.4TMU-28/B spray tanks (BDS)
14.1.2.5Ton containers (BDS)
14.1.2.6M360 projectiles, 105mm (PMD and MDM)
14.1.2.7M104, M110, M121, M121A1, and M122 projectiles, 155mm (PMD and MDM)
14.1.2.8M2 and M2A1 mortar cartridges, 4.2-inch (PMD and MDM).
14.1.2.9M23 mines (Mine Machine)

14.1.3 The treatment objectives for the RSM are to: (1) separate the liquid agent from the rocket, sending the agent to the Agent Collection System (ACS) and (2) shear the rocket into eight pieces for further treatment in the Deactivation Furnace System (DFS).

14.1.4 The treatment objective for the BDS is to separate the liquid agent from its container and send the agent to the ACS and the bulk item casing to the Metal Parts Furnace (MPF) for further treatment.

14.1.5 The treatment objective for the PMD is to separate, as applicable, explosive and miscellaneous components and bursters from the munitions and send the burster to the RSM for further treatment. All miscellaneous and explosive components and sheared bursters are sent to the DFS for further treatment.

14.1.6 The treatment objective for the MDM is to separate the liquid agent from the munition and send the agent to the ACS and the casing to the MPF for further treatment.

14.1.7 The treatment objective for the Mine Machine is to separate the agent from the mine and transfer the mine and explosive components to the DFS for further treatment.

14.1.8 The treatment objective for the Cutter Machine is to gain access to the interior components of overpacked/reject munitions or other cylindrical items so that the liquid agent can be sent to the ACS or SDS for further processing, and the metal components to the MPF or DFS (if energetically configured) for further treatment.

14.2 ROCKET SHEAR MACHINE

14.2.1 Physical Characteristics

14.2.1.1 The rocket handling system, of which the RSM is a part, is designed to prepare the GB and VX M55 rockets for demilitarization. The rocket handling system transports the rockets from the Munitions Demilitarization Building (MDB) Unpack Area (UPA), through the Explosive Containment Vestibule (ECV), to the Explosive Containment Rooms (ECRs) where the chemical agent from the rocket is drained and the rocket is then sheared into pieces that can be safely processed through the DFS. The chemical agent drained from the rocket is collected by the ACS, a separate system that includes the Agent Quantification System (AQS) and the agent holding tanks, as well as associated pumps, valves, piping, and other ancillary equipment. It is then incinerated in the Liquid Incinerators (LICs).

14.2.1.2 The rocket handling system consists of two identical process lines designed to operate simultaneously. Both rocket-processing lines (A and B) are located on the second floor of the MDB. Each line consists of a rocket metering input assembly, two input conveyors, and an RSM.

14.2.1.3 The rocket input metering system, Input Conveyor 1, and the airlock assembly are located in the MDB UPA. Input Conveyor 2 is located in the ECV; it separates the UPA from the ECRs. The RSMs, which actually drain and shear the rockets, are located in the ECRs.

14.2.1.4 The rocket metering assembly and the input conveyors are not considered part of the RSMs but are part of the material handling equipment system. However, the rocket metering assembly and input conveyors will be discussed in this attachment since their operation has a direct impact on the operation and maintenance of the RSM.

14.2.1.5 Equipment Installation

14.2.1.5.1 The equipment that constitutes the rocket handling system has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the rocket handling system equipment has been installed in accordance with the equipment’s design specifications and drawings.

14.2.1.6 Dimensions and Location

14.2.1.6.1 The approximate size of the RSM is 19 feet long by four feet wide by seven feet high. Most of the machine components are nickel-plated, and others are coated with a corrosion-resistant epoxy paint to protect against the corrosive action of the decontamination solutions used at the facility. The RSM's approximate dead weight is 3,500 pounds.

14.2.1.6.2 The RSMs for rocket processing lines A and B are located in ECRs A and B, respectively, on the second floor of the MDB. To provide effective containment in the event of any spills, leaks, or explosions, the ECRs have been equipped with blast doors and blast gates that remain closed while punching, draining, and shearing operations are taking place. Furthermore, each ECR is provided with a containment sump, and the air from the rooms is cycled through a ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, each ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene. To ensure that this design limit is not exceeded, no more than two rockets (one to be drained and the other to be sheared) are allowed inside each ECR at any given time.

14.2.1.7 Conveyors

14.2.1.7.1 The rocket input metering system, Input Conveyor 1, and airlock assembly are located in the MDB UPA. Input Conveyor 2 is in the ECV. The ECV separates the UPA from the ECRs.

14.2.1.7.2 The rocket metering assembly and the input conveyors are not considered to be part of the RSM; instead, they are considered part of the material handling equipment system.

14.2.1.8 Gates

14.2.1.8.1 The rockets are transferred either automatically or by remote manual control from the ECV into the ECRs through one of two ECR blast gates. These gates open to receive a rocket and will not close until a rocket is transferred completely into the ECR.

14.2.1.9 Pumps and Transfer Lines

14.2.1.9.1 The RSMs are equipped with pumps to remove chemical agent from the rockets. The drained chemical agent is transferred from the RSM through lines connecting the pumps to the ACS.

14.2.1.10 Sump Pump

14.2.1.10.1 Each of the two ECRs is provided with a containment sump. Each sump is serviced by a sump pump located in the Munitions Corridor. Sump pump operation is controlled by a local-off-remote switch and must be designated by the toxic area entrant for either local (local manual) or remote (level-controlled) operation. When a sump level alarm is sent to the CON, the liquids collected in the sump are pumped to a spent decontamination holding tank.

14.2.1.11 Tanks and Containers

14.2.1.11.1 There are no tanks or containers directly associated with the RSMs. Agent from the RDS is pumped directly to the AQS, which is part of the ACS.

14.2.1.12 Feed System

14.2.1.12.1 The rocket metering input assembly consists of a feed table, a rotating drum, and a reject table. The rocket metering input assembly receives the rocket to be demilitarized, verifies the orientation of the rocket (all rockets must be fed to the rocket processing line with their fuse end first), and feeds the rocket to the Input Conveyor 1 and airlock assembly. Operators in the UPA manually load the rockets in their shipping and firing tubes (fuse end first) into the rocket metering input assembly. This assembly feeds the rockets, correctly oriented, one at a time, to the rocket processing line. Exit from the rotating drum is via a simple flapper gate that is normally kept closed.

14.2.1.12.2 When the rocket metering input assembly is being operated remotely by the Programmable Logic Controller (PLC) and the CON, the PLC coordinates the movement of the rotating drum with the operations of the rocket input conveyors and the RSM. The rocket metering input assembly's rotating drum loads rockets onto Rocket Input Conveyor 1 only if rockets are not present on either Rocket Input Conveyor 1 or 2.

14.2.1.13 <u>Input Conveyor 1 and Airlock Assembly</u>

14.2.1.13.1 The Input Conveyor 1 and airlock assembly separate the UPA from the ECV. The conveyor receives the rockets as they roll out of the rocket metering input assembly's rotating drum and moves the rockets forward to Input Conveyor 2, located in the ECV. The conveyor is provided with a retro-reflective infrared sensor to detect the presence of a rocket on the conveyor.

14.2.1.14 <u>Input Conveyor 2</u>

14.2.1.14.1 Input Conveyor 2, located in the ECV, transfers the rockets from Input Conveyor 1 to the ECR blast gate that separates the ECV from the ECR. When the RSM is ready to receive the next rocket and the blast gate opens, Input Conveyor 2 pushes the rockets through the blast gate into the ECR. The ECV isolates the ECR from the UPA, and the purpose of Input Conveyor 2 is to transport the rockets between these areas.

14.2.1.14.2 A stop on the conveyor coordinates the movement of the rocket with the opening of the blast gate. A position sensor determines when the rocket has arrived at the stop. The stop consists of a steel plate located between the rollers near the discharge end of the conveyor. The plate is raised to stop the rockets until the munition access gate opens to indicate that the RSM is ready to receive the next rocket. After the blast gate opens, the stop is lowered, which then allows the rocket to pass through the blast gate to the RSM.

14.2.1.15 <u>Instrumentation</u>

14.2.1.15.1 The RSMs are operated by PLCs. The PLCs interface with the controls and instruments for the RSMs. All the instrumentation installed on the machines is designed to relay information to the PLC, and does not offer any local operator control.

14.2.1.15.2 There are a variety of sensors installed to support the operation of the RSMs. The sensors are used to track process flow through the machines and to continually update the PLC with new information. The sensors also indicate cylinder or actuator position. These sensors are listed in Table 14-2-1[1] by switch number, sensor type, and a brief functional description.

14.2.1.16 <u>Electrical System</u>

[1] All tables are located at the end of this Attachment.

14.2.1.16.1 The electrical power supply and distribution network for the process systems are provided by the local utility and by the installation. Electrical power has been extended to the MDB complex as part of the site development. Additionally, there are two backup power systems: essential and uninterruptible. Attachment 9 (Contingency Plan) provides detailed information regarding the backup power systems.

14.2.1.17 Heating, Ventilation, and Air Conditioning System (HVAC)

14.2.1.17.1 The HVAC system for the MDB consists of a once-through cascade system servicing the MDB process areas, a stand-alone HVAC system servicing the MDB CON, and miscellaneous HVAC systems servicing the Category D areas. The primary means of preventing the release or spread of contamination is through the use of cascaded pressure control. The CON is maintained at a positive pressure with respect to the atmosphere, while toxic areas are maintained at a negative pressure with respect to the atmosphere. This ensures a flow of air from the cleanest areas to areas with ascending potential for higher contamination.

14.2.1.17.2 Each room in the MDB has a designated category rating of A, A/B, B, C, D, or E based upon the potential for agent contamination. Rooms assigned a Category A rating (negative pressure), like the ECRs, are routinely contaminated by either agent liquid or vapor. Rooms with a Category B rating (negative pressure) have a high probability of agent vapor contamination resulting from routine operations. Rooms with a Category C rating (negative pressure) have a low probability of agent vapor contamination. Rooms with a Category D rating (atmospheric pressure) have a very remote probability of ever being contaminated by agent. Rooms with a Category E rating (positive pressure) are maintained from being contaminated by agent at all times.

14.2.1.17.3 The control of pressure for the incinerator rooms is accomplished by the control system. The pressure for the other rooms is balanced manually before facility start. The airflow and pressure differentials are regulated manually by fixed balancing dampers to maintain the desired negative environment in the MDB. Isolation dampers are located between Category A, A/B, or B rooms and Category C rooms to prevent possible migration of chemical agent to a lower contamination category area in case of an agent spill and a power failure. These isolation dampers are designed to fail closed.

14.2.1.17.4 Three air handling units supply air to all Category A, A/B, B, and C rooms in the MDB. During normal processing, two air-handling units are online, with the third air-handling unit serving as a spare. Conditioned air is supplied to the air supply-handling units. The filters on the inlet of the air-handling unit are used to remove dust contained in the air. The units have heating coils that are supplied by hot water for use in the winter and cooling coils supplied by chilled water for use in the summer. Outside air flowing across the coils is either heated or cooled. A blower on the unit is used to pull air from outside and deliver the air to the building rooms.

14.2.1.17.5 Air removed from the MPB is exhausted to air filtration units. The MPB is maintained at a negative pressure of approximately 1.8 inches of water column. The exhaust air filtration units contain filter media (carbon adsorption units) used to ensure that agent is not released to the environment.

14.2.1.17.6 Air removed from the ECRs is exhausted to air filtration units. The ECRs are maintained at a negative pressure of approximately 2.0 inches of water column. The exhaust air filtration units contain filter media (carbon adsorption units) used to ensure that agent is not released to the environment.

14.2.1.17.7 Each exhaust filtration unit has ACAMS ports to detect agent breakthrough and send an alarm to the CON for the current agent campaign. The ACAMS sample as described in Attachment 22 (Agent Monitoring Plan).

14.2.1.17.8 Each exhaust filter unit is provided with a centrifugal fan that discharges the air to the atmosphere through an exhaust stack. Air flows through each exhaust filtration unit with a range of 13,000 to 16,000 cubic feet per minute. Air exhausted through the stack is monitored for the presence of GB and VX chemical agent.

14.2.1.18 Fire Protection System

14.2.1.18.1 The fire detection system in the ECRs consists of thermal (heat) detectors, fire dampers, and a fire water system. There are four thermal (heat) detectors mounted on the ceiling of each ECR. The detectors will alarm the CON if extreme heat is detected. In the event that a fire is visually noted, there are two manual pull fire alarms in each ECR that can be used to signal locally at the CON. Since explosives are processed in the ECR, each ECR is also equipped with a deluge system that has three ultraviolet flame detectors and three spray nozzles that are connected to a 2-inch fire water line. Fire dampers are provided in ducts passing through fire-rated walls and ducts serving the MDB. The fire dampers are required to restrict fire propagation in the MDB through the HVAC ducts.

14.2.1.19 Alarm and Communication Systems

14.2.1.19.1 The MDB is equipped with telephones for TOCDF-wide communication. Personnel will be able to use this system to summon assistance in an emergency. The ECR is equipped with horn speakers and Closed Circuit Television (CCTV) so that the operator in the CON can visually observe the operations in the ECRs and notify facility personnel in the event of an emergency. Fire alarms, initiated by the automatic heat detection system or the manual pull stations, are described above. Also, instrumentation alarms will send signals to the CON.

14.2.2 Operations and Maintenance

14.2.2.1 There are two systems that process rockets prior to incineration. These systems operate in parallel, each in its own ECR. This description covers the operation of one rocket system. Operation of the second rocket system is identical. Either line is capable of meeting the maximum feed rate of the DFS, and the two lines are coordinated with each other. Pallets containing leaking rockets are handled similarly to pallets without leakers, except that for sealed[2] ONCs determined, via Automatic Continuous Air Monitoring System (ACAMS) monitoring, to have agent levels greater than 40 TWA, munition unpacking occurs in the TMA. The process description for leaking rockets can be found in Attachment 9 (Contingency Plan).

[2]The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

14.2.2.2 General System Operation

14.2.2.2.1 The RSM is located in the ECR and is comprised of two major workstations: the RDS and the RSS. The rockets are punched and the chemical agent is drained at the RDS for incineration in the LIC, and the drained rockets are sheared into pieces at the RSS and are then incinerated in the DFS.

14.2.2.2.2 The RDS consists of an input conveyor, a rotator, upper and lower clamps, a vent punch, front and rear drain punches, a lift table, and a positive stop cylinder. After the ECR rocket access blast gate opens to indicate that the RSM is ready to process the next rocket, the gate's "open" position switch indicates to the RDS to start the hydraulic motor of the RDS input conveyor. A positive stop is normally extended at the conveyor discharge end except to transfer the rocket from the RDS to the RSS. The positive stop cylinder is designed to block the rocket's movement through the conveyor and position it to be punched and drained at the RDS. After the rocket is in position at the drain station, the blast gate closes and the rocket is clamped to initiate the drain cycle.

14.2.2.2.3 The upper clamp cylinders are hydraulically linked and are designed to operate simultaneously. The bottom clamp is designed to maintain a tight contact around the drain holes to ensure maximum suction from the agent feed pump during the draining cycle.

14.2.2.2.4 While the rocket is clamped, the RDS input conveyor is stopped, the vent and punch cylinders are extended, and the rocket is punched. The agent is drained from the rocket into the AQS verification tank for a predetermined time interval (controlled by a drain timer). Once the AQS verifies that the rocket has been drained, the clamp and the positive stop cylinders retract, and the lift table cylinders raise the table. The rotator then rotates the cylinder 90° in the counterclockwise direction (looking at the tail end of the rocket) to minimize the possibility of residual agent dripping out of the rocket while it continues to be processed. The rocket punching operation is coordinated with the ECV/ECR Feed Blast Gate. The gate must be closed to punch the rocket.

14.2.2.2.5 After the rocket has been rotated, the lift table cylinders return the lift table to its original position and the rotator is rotated back to its original home position. If the RSS has signaled that it is ready to receive the rocket, both the RDS input conveyor and the RSS input conveyor are then started and the RDS Positive Stop is retracted in order to move the rocket to the RSS. The RDS input conveyor will continue to run until a new rocket reaches the RDS positive stop cylinder.

14.2.2.2.6 The RSS consists of a feed conveyor, collar index stops, pusher, and a shear cylinder and blade. Once the rocket has been drained and leaves the RDS, the rocket feed conveyor, which is a hydraulically-driven roller conveyor, moves the rocket up to the collar stops at the RSS. Fiber-optic sensors located near the shear blade signal the collar stops to be extended. The feed conveyor then stops, and the pusher in the rocket transport assembly is activated. The pusher is designed to keep the rocket in position against the collar stops while the shear blade cuts the rocket and to move the rocket into position for each successive cut. The collar stops are extended once for the fuse cut and are retracted for all other cuts.

14.2.2.2.7 Each rocket is sheared into eight pieces by the shear blade, which is cooled with water or decontamination solution to prevent the ignition of the rocket propellant by a hot blade. The flow of water or decontamination solution is controlled with a solenoid valve that opens just before the shear blade is extended and closes immediately after the blade is retracted.

14.2.2.2.8 To cut the rocket, an encoder on the pusher counts off the relative position of the rocket based on the pusher's home position. Seven strokes of the shear blade are needed to cut the rocket into eight pieces. The first stroke of the shear cuts off the front end of the rocket, severing the fuse. The first rocket piece to be processed after startup of the rocket processing line is immediately fed to the DFS through the DFS blast gate. The second through fifth sections, are then cut and collected on top of the DFS blast gate before being fed to the incinerator at least 30 seconds later. The sixth and seventh rocket sections are then cut, collected on top of the DFS blast gate, and fed immediately to the incinerator. The eighth piece, which corresponds to the rocket's fin assembly, is then pushed on to the blast gates where it remains until the fuse of the next rocket is cut; then the DFS blast gate and RSM cycles start all over again. As the shear blade cuts each rocket section, the pusher continues to move the rocket forward to position it for the next cut. The sequence for opening and closing the DFS blast gate is controlled by the DFS controller. The shearing operation is coordinated with the opening of the top of the DFS blast gate, and the ECV/ECR feed blast gates.

14.2.2.3 Setup Procedures

14.2.2.3.1 Automatic operation is the preferred mode for the startup, shutdown, and emergency shutdown of the RSMs and is to be used when possible for all operations. When the system is in automatic and remote manual (from the CON) mode, all system interlocks are automatic, causing the system to fail-safe should an abnormal or upset condition occur. Both rocket processing lines A and B have the same startup, shutdown, and emergency shutdown procedures. Before the startup procedures can begin, the operator must ensure the following systems are operable and online: DFS, DFS pollution abatement system (PAS), Decontamination System, Spent Decontamination System (SDS), Process Water System, Cooling Water System, Instrument Air System, Uninterruptible Power Supply System, Plant Air System, Secondary Power System, Primary Power System, Emergency Generator System, MDB HVAC System, ACS, and CON Console Operations.

14.2.2.4 System Startup

14.2.2.4.1 The procedures for RSMs startup are contained in the appropriate RSM system standard operating procedures document. In summary, the systems are started by placing Line A and B RSMs in automatic mode, including the RDS and RSS sequencers, and then pressing the initialization start icon. This is accomplished remotely in the CON. When the CON display system start/stop icon changes from flashing to steady green, the rocket processing lines are ready to accept rockets.

14.2.2.5 Feed

14.2.2.5.1 The rocket is placed on the rocket metering input assembly. If the rocket is correctly oriented, it is then transported to the blast gate leading to the RSM. During that process, appropriate inspection and paperwork are completed to satisfy the various requirements associated with the Army Surety Program, the Chemical Weapons Convention (CWC), and hazardous waste identification and tracking requirements. Waste quantification requirements are met when the agent is drained from the rocket at the RDS and pumped to the AQS. These various activities are recorded either manually, or by the Process Data Acquisition and Recording System (PDARS), and such records will be available in the facility operating record.

14.2.2.6 Interlock Processes

14.2.2.6.1 The RSM is operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the RSMs neither interfere with each other, nor operate in a manner that is unsafe to human life and health or unprotective of the environment. The RSM interlocks are PLS-3 and PLS-6. PLS-3 is described in this section. PLS-6 is described in Paragraph 14.2.2.8.2. In addition, the interlocks remain in place during manual operation. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.2.2.6.2 When a rocket stops just before it enters the ECR, the ECR blast gate opens and the rocket is conveyed into the ECR. An infrared retro-reflector sensor detects the rocket while it is passing through the blast gate. The sensor is interlocked with the blast gate so that the gate remains open until the entire rocket has successfully passed through the blast gate and enters the ECR.

14.2.2.6.3 Once the rocket enters the ECR, it is processed by the RSM RDS. The rocket entering from the blast gate is transferred to the RSM Input Conveyor. The Input Conveyor moves the rocket fully forward until it is stopped by the rocket positive stop, which has been extended into the path of the rocket. As the rocket is stopped by the positive stop, its arrival is also sensed by fiber-optic sensor PLS-3. As PLS-3 is activated by the rocket interrupting the fiber-optic beam, the system is signaled that there has been a good rocket transfer between the ECV and the ECR and that the rocket is positioned for processing at the RDS. This also starts the ECR blast gate closure and rocket clamping, followed by the punch and drain sequence.

14.2.2.7 Rocket Drain Station

14.2.2.7.1 Once the rocket is held firmly in position for processing, the vent and punch sequences starts. The operations of the vent and punch cylinders are sequenced as follows: the rear drain punch extends then retracts, punching the rocket; the vent punch then extends, punches the rocket, but is not retracted; the front drain punch is then extended and retracted; finally, the vent punch is retracted after the front drain punch is retracted. The drain timer starts running when the rear drain punch is retracted. Chemical agent is drained from the rocket to an AQS tank and then pumped to the agent holding tank.

14.2.2.8 Rocket Shear Station

14.2.2.8.1 After the rocket is drained, it proceeds along the feed conveyor and passes through fiber-optic sensor PLS-5, which is located on the feed conveyor rail. The sensor remains blocked until the rocket index ring is stopped at the Index stop. With the rocket fully forward against the stop, the sensor will be unblocked. This unblocked signal indicates that the rocket is fully forward for the first shear cut (fuze). During the RDS to RSS transfer, the ECR blast gate opens to allow the next rocket (if already present on conveyor #2), to proceed to the RDS. The blast gate is verified closed before punching or shearing operations are initiated.

14.2.2.8.2 As the rocket arrives at the end of the feed conveyor, it is sensed by the Shear Position Switch. When PLS-6 senses the rocket, it is interlocked with the ECR blast door so that the door will remain shut during the shearing operation. The feed conveyor then stops, and the rocket is sheared into eight pieces as previously described.

14.2.2.8.3 The rocket shearing sequence can only continue if the interlocks concerning “hazardous operations” are satisfied. This sequence precludes any hazardous operations, such as rocket shearing or punch operations, from taking place while the DFS gate, ECR blast door, or ECR blast gate is open. These hazardous operations are interrupted until these gates and door are closed. The DFS gate and ECR blast gate are also interlocked to prevent them from being open at the same time.

14.2.2.9 System Shutdown (Normal)

14.2.2.9.1 The rocket processing lines must be clear of rockets prior to system shutdown. The shutdown procedures for the RSM systems are contained in the appropriate RSM standard operating procedure document. In summary, the RSMs are shutdown after first ensuring that no rockets are being fed to the machines, the machines are clear of rockets, and there are no rockets in the blast gates (observed remotely using the CCTV). The system is remotely stopped by the CON operators. After this sequence is completed, the system is “parked”.

14.2.2.10 Emergency Shutdown

14.2.2.10.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition is defined as any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.2.2.11 Extended Shutdown

14.2.2.11.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation, or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the RSM systems have been parked. Some of the extended shutdown procedures are implemented during agent campaign changeover. Extended shutdown procedures include ensuring that agent drain valves are closed and may include installing a spectacle blind flange in the agent line downstream of the ACS pump.

14.2.2.12 Maintenance

14.2.2.12.1 To ensure that the RSM system is in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the RSM will be systematically subjected to preventive maintenance inspections.

14.2.3 Monitoring Procedures

14.2.3.1 Each RSM is equipped with several types of sensors, as shown in Table 14-2-1, to detect the presence and position of cylinders or actuators during operation as explained previously. These sensors ensure that the rockets will be processed safely by relaying information to the PLC.

14.2.3.2 The CON operators monitor the operations of the RSM through the demilitarization operator consoles and CCTVs. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provide operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into logbooks.

14.2.3.3 Chemical agent released in the ECRs will be contained by the sumps or controlled by the HVAC system. ACAMSs are used to monitor for the presence of agent in the ECRs and the ECV as described in Attachment 22 (Agent Monitoring Plan). A multi-agent monitoring plan shall be approved by the Executive Secretary before processing multiple agents.

14.2.3.4 Fire monitoring is described in Section 14.2.1.18, “Fire Protection”.

14.2.3.5 Waste Identification

14.2.3.5.1 By the time a rocket reaches the RSM, it will have been fully identified in accordance with Attachment 2 (Waste Analysis Plan).

14.2.3.6 Waste Throughput

14.2.3.6.1 The waste entering the RSMs is the complete rocket, to include the shipping and firing tube. The chemical agent is separated from the rocket and handled through the ACS. The rocket is sheared into pieces and delivered directly to the DFS for thermal treatment. In each case, quantification of the waste occurs: the agent is quantified in the AQS, and the rockets are quantified by the PDARS and by the manual record created by the CON operator who observes the RSM in operation. Any liquid agent that escapes during the draining process or the shearing process is decontaminated with decontamination solution. The spent decontamination solution goes down the DFS feed chute or is collected in the ECR sump and pumped to the SDS and will be eventually thermally treated in the LIC. Any liquid collected in the ECR sumps is emptied at least daily.

14.2.4 Inspection

14.2.4.1 A TOCDF Inspection Plan is contained in Attachment 5 (Inspection Plan) of this Permit and describes inspection requirements.

14.2.4.2 The RSM, BDS, PMD, MDM, and Mine Machine inspections prevent equipment deterioration and possible equipment malfunctions that would cause abnormal or upset conditions. The inspections are designed to reduce the potential impacts of operations on human health and the environment. In addition to daily inspections, the RSM, BDS, PMD, MDM, and Mine Machine will be monitored remotely by CCTV throughout operations.

14.2.5 Closure

14.2.5.1 Partial Closure

14.2.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the ECRs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; and maintenance and repair will be performed on the machines and other room components as necessary. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure from the Executive Secretary, the next campaign will commence when authorized and when it is appropriate to do so.

14.2.5.2 Final Closure

14.2.5.2.1 Closure of the site is addressed in Attachment 10 (Closure Plan).

14.2.6 Mitigative Design and Operating Standards

14.2.6.1 The ECR is a room where explosives or propellants could potentially be ignited. The design and operating plans for the ECR have been carefully prepared to anticipate this type of mishap. For example, as a worst-case situation, the operating plan limits the total amount of explosives or propellants that are present in the room at any one time so that in the event of an accidental ignition, the ECR could contain the reaction.

14.2.6.2 Protective systems in the ECR include an industrial-type, automatically activated fire sprinkler system. Also, water and decontamination solution outlets are available within the room for manual washdown and area cleanup. The floor of the room is sloped to a sump, and the sump dewatering system transfers the collected liquid to the SDS for disposal in one of the two LICs. Alternatively, the GB sodium hydroxide based spent decontamination solution may be shipped off site for treatment if the requirements of Attachment 2 (Waste Analysis Plan) have been met. Protective clothing is mandatory during cleanup of spilled explosives and propellants in the room, and care is taken to reduce the potential for spills.

14.2.6.3 If an explosion occurs in a containment room, it is expected that a portion of the agent will be combusted while the remainder will exist in a vapor or liquid form. In the ECR, the agent vapors will be contained in the room because both the blast valves and the leak-tight dampers will be closed. The blast valves will remain closed until the pressure decays to the point where the spring force is greater than the room pressure (0.5 pounds per square inch). At this pressure, the blast valve will open, but the leak-tight damper will continue to contain the gases. The leak-tight dampers will not be opened until the room gas pressure has decayed to approximately atmospheric pressure.

14.2.6.4 The ECR is completely surrounded by rooms that are ventilated to the carbon filter system. Therefore, any leakage out of the ECR as a result of a blast will be vented to the filter system.

14.2.6.5 Liquid agent in the ECR resulting from an explosion will be collected in the ECR sump. Because of the limited number of munitions that will be in the ECR at any one time, the amount of liquid agent released by an explosion is not expected to be greater than about two gallons. Once ventilation has been reestablished in the ECR (by reopening the gas-tight valves), DPE entries will be made, and the area will be cleaned with decontamination solution.

14.2.6.6 If DPE entry to the ECR is required after processing rockets and propellant, or if explosives may be present, the DPE Team shall thoroughly wet each other's DPE and the ECR floor (where they will be working) immediately prior to entering the ECR, to preclude the possibility of static discharge. A water hose is available at the decontamination station by the access door to each ECR.

14.2.7 <u>Environmental Performance Standards for Miscellaneous Units</u>

14.2.7.1 The RSM has been designed, installed, and is operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.2.7.2 describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.2.7.2 <u>Miscellaneous Unit Wastes</u>

14.2.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the RSM include M55 rockets and their fiberglass shipping tubes. These wastes have been identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.2.7.2.2 The maximum volume of wastes that will be processed at the RSM at one time is two rockets. The RDS can process one rocket while the RSS is processing the other rocket. All components of a rocket, including its shipping tubes are to be incinerated in the DFS (except for the drained chemical agent, which is pumped to the ACS and incinerated in the LICs).

14.2.7.3 <u>Containment System</u>

14.2.7.3.1 There is an RSM and PMD located in each of the two ECRs in the MDB. The containment system for each ECR is further described in Table 4 of this Permit. Each room contains curbs, walls, ceiling, and a sump. The floor is coated with an agent-resistant coating and sloped toward a sump. The walls, curbs, and ceiling are also coated with agent-resistant coating. The sumps located in each of the ECRs are primary containment sumps, and are identical. Each has a trench and dimensions of approximately 2.75 by 2.75 by 2.38 feet, with a capacity of about 89 gallons. The volume of the sump is more than sufficient to contain any chemical agent spill in the ECR.

14.2.7.3.2 The sumps are constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The external liner for each sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The concrete is designed to be free from cracks or gaps.

14.2.7.3.3 Each sump metal internal liner is equipped with a level sensor probe to detect liquid. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner will be sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for detection within 24 hours of occurrence.

14.2.7.3.4 The two ECRs are inside the MDB and are thus protected from climatic conditions and precipitation so no overflow of the containment system due to runon will occur.

14.2.7.4 Site Air Conditions

14.2.7.4.1 The following paragraphs describe the potential impacts of air emissions due to operation of the RSMs, BDSs, PMDs, MDMs, and the Mine Machine. A brief description of topographic and meteorologic characteristics of the Tooele area are presented as well as a summary of potential impacts on existing air quality in the Tooele region.

14.2.7.5 Topography

14.2.7.5.1 The DCD is located in Tooele County in the northwest portion of the State of Utah. The DCD spreads out over 19,364 acres in the middle of Rush Valley. Attachment 1 (Facility Description) provides detailed information regarding topography.

14.2.7.6 Meteorologic and Atmospheric Conditions

14.2.7.6.1 The climate around TOCDF is characteristic of semi-arid continental regions. Attachment 1 (Facility Description) provides additional information regarding meterologic and atmospheric conditions.

14.2.7.7 Air Quality

14.2.7.7.1 The TOCDF is located south of the Great Salt Lake Air Basin in the area designated by the EPA as the Wasatch Front Intrastate Air Quality Control Region [Title 40, Code of Federal Regulations (CFR) Part 81.52]. This region has been designated by the EPA as meeting all regulated pollutant National Ambient Air Quality Standards (NAAQS).

14.2.7.7.2 Historically, ambient monitoring at DCD has been conducted for sulfur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3), total suspended particulates (TSP), and particulates less than 10 microns in aerodynamic diameter (PM_{10}). No exceedances of existing state and Federal NAAQS have been observed at DCD. The DCD also has a network of agent monitors around the TOCDF.

14.2.7.7.3 Any air emissions from the demilitarization machines located in the ECRs or MPB are captured by the MDB ventilation system and processed through the MDB carbon filter system before being exhausted to the HVAC stack.

14.2.7.8 Prevention of Air Emissions

14.2.7.8.1 The RSMs, BDSs, PMDs, MDMs/PPMs, and Mine Machine are not sources of air emissions in and of themselves, but they are associated with treatment operations that could potentially emit air pollutants. For example, the RSM, Mine Machine, BDS, or MDM agent draining process could potentially release small quantities of agent due to evaporation. For the purposes of analyzing potential air emissions from these machines, it is assumed that the machines and ancillary equipment associated with the machines (e.g., piping and sumps), are the sources of pollutants. These air emissions will occur as part of normal TOCDF operations.

14.2.7.8.2 When the munitions are brought to the ECRs or the MPB, the munitions have already been identified, so the type of propellant, explosive, miscellaneous materials, and agent being drained from the munitions and bulk items is known. Physical and chemical characteristics of each waste are summarized in Attachment 2 (Waste Analysis Plan), and are not reproduced here.

14.2.7.8.3 Potential sources of air emissions from the RSMs, BDSs, PMDs, MDMs, and Mine Machine include agent, decontamination solution, and possibly metal particulates (from the shearing and cutting processes). Emissions of agent are predicted to occur due to vaporization.

14.2.7.8.4 Emissions of decontamination solution, which is a water-based cleaning solution, are predicted to result from evaporative processes. However, the vapor pressure of this solution (containing mostly water) at the conditions within the ECR or MPB is low; therefore, evaporative emissions are expected to be negligible.

14.2.7.8.5 Emissions of metal particulates in the ECRs are also expected to be negligible since the RSM shear blade and rocket are coated with the water/decontamination solution during the cutting process. Emissions of metal particulates in the MPB are also expected to be negligible because the bulk munitions are penetrated with a metal punch and no fragmenting is anticipated.

14.2.7.9 Operating Standards

14.2.7.9.1 Based on the above, agent is assumed to be the pollutant of concern from the RSM with respect to air emissions. The MDB carbon filter system is monitored for the presence of agent and the carbon beds will be replaced before breakthrough of all the cascading beds is possible.

14.2.7.9.2 Agent emissions from the RSM will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to the 120-foot HVAC stack.

14.2.7.9.3 The RSMs are located in the ECRs within the MDB. The ECRs are maintained at a pressure of approximately -2 inches of water column. These two rooms are maintained at the lowest pressures within the MDB so all air emissions from the RSM during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.2.7.9.4 Attachment 5 (Inspection Plan) addresses inspection and monitoring of the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, some operation procedures have been implemented to minimize the potential for air emissions while operating the RSMs:

14.2.7.9.4.1 Munitions will be drained of agent as soon as they are punched, thus reducing the likelihood of evaporation (agent will be collected by the ACS and contained in AQS tanks near the RSM).

14.2.7.9.4.2 Rocket processing on the RSM includes an automatic procedure to rotate the rocket 90° (longitudinally), after being drained, to minimize residual agent spills.

14.2.7.9.4.3 Sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect agent, and to determine loss of blower performance.

14.2.7.10 <u>Site Hydrologic Conditions</u>

14.2.7.10.1 A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.2.7.10.2 Solid and liquid releases of agent and other material from operation of the RSM or Mine Machine are fully contained within the ECRs. These releases, if any, will not impact soil, groundwater, or surface water, or degrade the existing quality of these media. Therefore, no adverse affects on these media are anticipated from operation of the rocket or mine handling system. Additionally, no adverse impacts on vegetation, current land use patterns, or human health are expected.

14.2.7.11 <u>Migration of Waste Constituents</u>

14.2.7.11.1 Migration of munition or bulk item wastes into the environment from RSM, BDS, PMD, MDM, or Mine Machine operations is not expected to occur. Therefore, no impacts on human health and the environment from the RSMs, BDSs, PMDs, MDMs, or Mine Machine are expected.

14.3. <u>BULK DRAIN STATION</u>

14.3.1 <u>Physical Characteristics</u>

14.3.1.1 The TOCDF bulk item processing system, which includes two BDSs, is designed to safely remove agent from items such as bombs, ton containers, and spray tanks. Following removal of the agent, the munition casing or container is sent to the MPF for further treatment. The chemical agent is collected by the ACS, a separate system that includes the AQS, agent holding tanks, associated pumps, valves, piping, and other ancillary equipment. The drained agent is then incinerated in the LICs.

14.3.1.2 The BDS processes munitions that are not configured with explosives, propellants, or other energetics, so the processing system is only concerned with separating the chemical agent from the munition or bulk item. The BDSs are designed to punch a hole in munitions or bulk items and drain the chemical agent from them. The following munitions and bulk items are processed on the BDS:

14.3.1.2.1 MK-116 Weteye bombs
14.3.1.2.2 TMU-28/B spray tanks
14.3.1.2.3 Ton containers.

14.3.1.3 The BDS begins at the munitions demilitarization gates, where the munitions are transferred from the Upper Munitions Corridor to the MPB BDS Hydraulic Conveyor. It ends where the BDS Hydraulic Conveyor transfers the bulk item to the MDM Indexing Hydraulic Conveyor that leads through two other indexing conveyors to the Lift Car Assembly at the far end of the MPB. Eventually, the bulk items reach the MPF for thermal treatment.

14.3.1.4 Equipment Installation

14.3.1.4.1 The equipment that constitutes the bulk item processing system has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the bulk item processing system equipment has been installed in accordance with the equipment's design specification and drawings, as stated in the permit.

14.3.1.5 Dimensions and Location

14.3.1.5.1 Each BDS is approximately 17 feet long, eight feet wide, and 10 feet high. The approximate nominal weight of each BDS is 16,500 pounds. The conveyors, which are an integral part of each BDS, are 17 feet long, five feet wide, and three feet high. They weigh approximately 3,000 pounds each. The BDSs are located on the second floor of the MDB in the MPB.

14.3.1.6 Conveyors

14.3.1.6.1 The BDS consists of a Munitions Transfer Conveyor, Main Frame Assembly, and a Punch and Drain Station. The munitions and bulk items are transferred onto the BDS in specially designed cradles that are mounted on MPF trays.

14.3.1.7 Gates

14.3.1.7.1 The cradles/trays are transferred automatically from the Munitions Corridor into the MPB through one of the two MPB gates. The gates are opened to receive bulk items and they will not close until the bulk item is transferred completely into the MPB (see Section 14.3.2.9 on interlocks).

14.3.1.8 Pump and Transfer Lines

14.3.1.8.1 The BDSs are equipped with pumps to remove agent from the munitions and bulk items. The agent is transferred from the BDS through lines connecting the pumps to the ACS and to the agent holding tanks.

14.3.1.9 Tanks and Containers

14.3.1.9.1 There are no tanks or containers directly associated with the BDSs. Agent from the BDS is pumped directly to the ACS.

14.3.1.10 Feed System

14.3.1.10.1 The BDS Main Frame Assembly, which is constructed of steel, supports the conveyors, sensors, hydraulic apparatus, punch, drain tube apparatus, and other ancillary equipment associated with the BDS.

14.3.1.10.2 The munitions and bulk items (including the cradle and tray) are weighed before and after the agent draining process to obtain the full and empty weights of the items. A set of load cells, mounted on hydraulic cylinders in the Munitions Transfer Conveyor, are designed to accomplish this.

14.3.1.10.3 The Punch Station consists of a hydraulic cylinder equipped with a punch and hold-down clamp. The hydraulic cylinder is mounted vertically on the upper front of the BDS column assembly, which stands next to the conveyor (toward the center of the MPB) so that the Punch is suspended over the center line of the conveyor. When extended, the cylinder punches a hole through the top of the munition or bulk item. The punch is mounted at the top of the column when processing spray tanks, ton containers, and MK-116 Weteye bombs and lower on the column when processing the other bombs. Two position switches on the cylinder sense the position of the punch (retracted or extended).

14.3.1.10.4 The BDS hold-down clamp is mounted on the hold-down support assembly, below the punch cylinder. It consists of two small hydraulic cylinders, one on each side of the punch, that extend a hold-down clamp near the surface of the bulk item. The hold-down clamp prevents excessive lifting or rolling of the munition or bulk item in place when the punch is retracted. The hold-down clamp cylinders are actuated by hydraulic fluid from the same control valve as the conveyor lift cylinders.

14.3.1.10.5 The Drain Station consists of an agent drain probe that is lowered into the bulk item through the hole made by the punch. The agent drain probe is a stainless steel tube connected by flexible tubing to the agent piping. A hydraulically driven lead screw is used to raise and lower the agent drain probe. All components are mounted on the same BDS column assembly as the Punch Station. Four position switches next to the probe sense the extent of probe travel (retracted and first, second, and third drain positions). The height of the drain probe is adjusted for different munitions by clamps that hold it to the lead screw. The amount of agent removed is quantified at the Drain Station by the use of before and after agent drain weights.

14.3.1.10.6 BDS-101 can be equipped with two spray nozzle assemblies to process bulk munitions that require special handling. These spray nozzles are inserted into a bulk container that has been punched and drained. The spray nozzles will be used to spray decon solution, weak acid solutions (e.g., 2% HCl), and process water into bulk containers that have heels with high metal concentrations. A drain probe will be lowered through a punched hole in the bulk container for removal of the rinse material.

14.3.1.11 Instrumentation

14.3.1.11.1 Instrumentation associated with the BDSs is remotely monitored in the TOCDF CON. The instruments are primarily associated with the hydraulic and pneumatic systems, electronic position sensors, load cells, drain verification system, and interlocks. Table 14-3-1[3] summarizes the various sensors for the BDS and their function. Details of the instruments and sensors are shown on drawings contained in Attachment 11 (General Facility Drawings).

14.3.1.12 Electrical System

14.3.1.12.1 See Section 14.2.1.16.

14.3.1.13 Heating, Ventilation, and Air Conditioning System (HVAC)

14.3.1.13.1 See Section 14.2.1.17.

14.3.1.14 Fire Protection System

14.3.1.14.1 The fire protection system in the MPB consists of thermal (heat) detectors and fire dampers. There are 28 thermal (heat) detectors mounted on the ceiling and 10 on the underside of the platform of the MPB. There are five manual pull fire alarms in the MPB.

14.3.1.14.2 As mentioned above, fire dampers are provided in ducts passing through fire-rated walls and ducts serving the MDB. The fire dampers restrict fire propagation in the building through the ventilation air ducts.

14.3.1.15 Alarm and Communication Systems

14.3.1.15.1 The MDB is equipped with telephones for TOCDF-wide communication. Personnel will be able to use this system to summon assistance in an emergency. The MPB is equipped with horn speakers and CCTV so that the CON operator can visually observe the operations in the MPB and notify facility personnel in the event of an emergency. Fire alarms, initiated by the automatic heat detection system or the manual pull stations, are described above. Also, instrumentation alarms will send signals to the CON.

14.3.2 Operations and Maintenance

14.3.2.1 Munitions and bulk items to be processed at the BDS are received from the Upper Munitions Corridor, and transferred to the MPB. As the conveyor moves the bulk item(s) to the correct position under each station, the BDS punches and drains the bulk item.

14.3.2.2 As mentioned previously, all munitions are received and processed in metal holding cradles that are mounted on MPF trays. Ton containers, Weteye bombs, and spray tanks are received one at a time. The following section further describes the operating sequence for munitions and bulk items processing at the BDS.

[3] All tables are located at the end of this Attachment.

14.3.2.3 The BDS is designed to receive waste feed, in terms of munitions or bulk items, and treat and forward the munitions or bulk containers to the MPF, which receives the items after they are drained. The MPF maximum feed rates are specified in this Permit. Upon reaching the BDS, each munition or bulk item waste will have been identified. Physical and chemical characteristics of each waste are summarized in Attachment 2 (Waste Analysis Plan).

14.3.2.4 In addition to the routine bulk container processing procedures described herein, the TOCDF will conduct additional "special handling" process steps for bulk containers with heels with high metal concentrations. Two spray nozzles will be inserted after the agent has been drained from the bulk munition requiring special handling. The spray nozzles will be used to wash the bulk container with a series of rinses. The first rinse will include the use of decontamination solutions (e.g., sodium hydroxide). A minimum of one process water rinse will follow. The next rinse will use a weak acid solution (e.g., 2% hydrochloric acid solution). The final rinse will use process water, which may be combined with a small amount of weak acid to maintain a low pH and keep metals in solution. These rinses will be repeated in whole or in part and as necessary until the requirements specified in Attachment 2 (Waste Analysis Plan), have been satisfied. The bulk container will be raised so that the rinse material collects in one area of the bulk container. A drain tube will be inserted into this area and the rinse material will be transferred to the Conditioning and Settling System (CSS), which will be operated in accordance with R315-5-3.34. Three holes will be punched in the bulk container to accommodate the two spray nozzles and the drain tube. The rinse materials and the drained and cleaned bulk containers will be managed as described in Attachment 2 (Waste Analysis Plan).

14.3.2.5 <u>General System Operation</u>

14.3.2.5.1 <u>Operating Description: MK-116 (Weteye) Bomb Processing</u>

14.3.2.5.1.1 At the BDS, bombs are punched, drained of agent, and then punched again. The cradle/tray is configured to hold one MK-116 Weteye bomb for processing at the BDS. The cradle/tray moves on the indexing conveyor to the correct position for the type of bomb being processed. Electronic sensors on the outer side rail of the Punch and Drain Station detect the presence and position of the cradle/tray.

14.3.2.5.1.2 The sensor at the punch position is actuated by the target on the munition cradle. The indexing conveyor stops when the tray arrives at the Punch station, and then the conveyor lowers to rest the cradle/tray on the main frame anvils. A hole is punched in the first bomb. The hold-down cylinders extend to prevent excessive lifting or rolling of the bomb while the Punch retracts. When punching is complete, the punch cylinder retracts, the transfer conveyor raises, the hold-down cylinders retract, and the conveyor moves the cradle/tray to the drain position. An electronic sensor stops the cradle when it arrives at the correct position for draining. The MK-116 Weteye bomb is processed in a slightly different manner than the other bombs. Like the other bombs, a minimum of two holes are punched in each MK-116 Weteye; however, unlike the other bombs, agent is drained from more than one hole because there are three agent cavities in the MK-116 Weteye bomb.

14.3.2.5.1.3 After punching each bomb, and prior to draining each bomb, the indexing conveyor, tray, cradle, and munition/bulk item are raised hydraulically off the anvil and weighed by a set of four Load Cells. These cells are located under each corner of the indexing conveyor and are mounted on the hydraulic cylinders that raise the indexing conveyor. Weighing is accomplished electronically by actuating the Load Cells (conveyor in raised position). The weight is recorded by the PLCs.

14.3.2.5.1.4 A drain probe is lowered into the punched hole at the drain station. The probe extends to a preset depth inside the interior of the bomb. Draining starts once the bubbler verifies the presence of agent and continues for a predetermined length of time to ensure all but residual chemical agent has been removed. After expiration of the time period, the drain probe retracts and the munition is weighed again.

14.3.2.5.1.5 For MK-116 (Weteye) Bombs, three holes will then be drilled; one in the bottom of the rear cavity, one in the bottom of the middle cavity, and one in the bottom of the front cavity. Each hole will extend through the bottom of the weteye and the bottom half of the shipping container. This will allow remaining agent to drain into the cradle underneath before the cradle, shipping container, and weteye are fed to the MPF.

14.3.2.5.1.6 When agent draining is complete and all munitions have been processed on the BDS, the entire cradle/tray is forwarded to the MDM Indexing Hydraulic Conveyor that receives the cradle and delivers it to the opposite end of the MPB.

14.3.2.5.2 Operating Description: Ton Container and Spray Tank Processing

14.3.2.5.2.1 At the BDS, ton containers and spray tanks are punched, drained of agent, and punched again. The ton containers and spray tanks are moved to the punch position by the indexing conveyor. Sensor targets located on the side of the cradles activate electronic sensors that stop the cradle at the correct position for punching and draining. When the bulk item is stopped at the punch position, the indexing conveyor lowers allowing the cradle/tray to rest on the main frame anvils. Simultaneously, the hold-down cylinders extend to prevent excessive lifting or rolling of the bulk item while the Punch retracts. The Punch creates a hole in the bulk item. When punching is complete, the punch cylinder retracts, the transfer conveyor raises, the hold-down cylinders retract, and the bulk item moves to the drain position. An electronic sensor stops the bulk item when it arrives at the correct position for draining.

14.3.2.5.2.2 Prior to draining (and after punching), the indexing conveyor, tray, cradle, and munition/bulk item are raised hydraulically off the anvil and weighed by a set of four Load Cells. These cells are located under each corner of the indexing conveyor and are mounted on the hydraulic cylinders that raise the indexing conveyor. Weighing is accomplished electronically by actuating the Load Cells (conveyor in raised position). The weight is recorded by the PLCs.

14.3.2.5.2.3 A drain probe is lowered into the punched hole on the bulk item at the Drain Station. The probe extends to a preset depth inside the interior of the bulk item. Draining starts as soon as the bubbler system verifies the presence of chemical agent. The bulk item is drained to ensure all but residual chemical agent has been removed. After the drain probe retracts, the bulk item is re-weighed by the Load Cells. By comparing the full and drained weights, the amount of chemical agent removed is obtained. The indexing conveyor then moves the bulk item to the correct position for vent hole punching, the conveyor lowers, a vent hole is punched (the same size as the drain hole), and the conveyor raises. The bulk item (with cradle/tray) is then transferred to the MDM Indexing Hydraulic Conveyor that receives the cradle and delivers it to the opposite end of the MPB.

14.3.2.5.2.4 The spray tanks will be processed with an additional step before being transferred to the MDM Indexing Hydraulic Conveyor. The BDS has been modified by adding a Nose Drill Station, so that a hole can be drilled in the nose of the spray tank. This hole will facilitate venting of the internal spray tank nose construction materials when the spray tank is in the MPF.

14.3.2.6 Setup Procedures

14.3.2.6.1 The BDS is initialized before being placed in service. All major system components are remotely activated from the CON, and the PLCs verify the proper operation of the system. The indicators in the CON are observed to verify the status of the BDS. The BDS major system components are turned off, and the initialization procedure is completed. At this point, the BDS is ready to receive a start command from the CON.

14.3.2.7 System Startup

14.3.2.7.1 The procedures for BDS startup are contained in the appropriate BDS system standard operating procedures document. In summary, the systems are started by placing Line A and B BDSs in automatic mode, selecting the type of agent and bulk item to be processed, and then pressing the initialization start icon. This is accomplished remotely in the control room. When the control room display system start/stop icon changes from flashing to steady green, the processing lines are ready to accept bulk items.

14.3.2.8 Feed

14.3.2.8.1 Waste quantification requirements are met when the weighing operation is performed at the BDS. These various activities are recorded either manually, or by the PDARS, and such records will be available at the plant in the facility Operating Record.

14.3.2.9 Interlock Processes

14.3.2.9.1 The BDS is operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the BDS do not interfere with each other or operate in a manner that is unsafe to human life or unprotective of the environment. The interlocks remain in place during manual operations.

14.3.2.9.2 Should the BDS machine malfunction, the demilitarization line will stop until the problem is corrected. The process step being performed by the BDS is displayed on the CON screen so that the operator can determine which process sequence step was not completed. The BDS cannot be started again until the problem is corrected because the system is interlocked (in a fail safe mode). The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.3.2.9.3 There are two interlocks associated with the BDS operations that are activated by sensors P2 and P5 (see Table 14-3-1 for a description of these sensors). When a munition and cradle/tray are being transferred from the Munitions Corridor to the MPB through the munitions demilitarization gates, the gate will remain open and interlocked until the cradle/tray arrives at the BDS Punch Station. Sensor P2 detects the presence of the cradle/tray at the Punch Station and allows the gate to close.

14.3.2.9.4 After a munition has been processed at the BDS, it passes sensor P5, a retroreflector type sensor, which signals that the cradle/tray is being transferred to the next conveyor. If another munition is waiting in the Munitions Corridor at the munitions demilitarization gates, and no BDS (or MDM) processing is being conducted, the gate(s) will open to allow the next cradle/tray into the MPB.

14.3.2.10 System Shutdown (Normal)

14.3.2.10.1 After the stop command has been issued, the BDS is "parked." When the BDS is parked, it is configured so that the conveyor lift table, hold-down cylinders, and punch cylinder are extended; this is the fail-safe mode.

14.3.2.10.2 After the bomb and bulk item demilitarization campaigns have been completed, the BDS will no longer be needed except to transfer projectiles and mortars from the Munitions Corridor to the MDMs, which are also located in the MPB.

14.3.2.11 Emergency Shutdown

14.3.2.11.1 In the event of an abnormal or upset condition associated with the BDS, the processing operations are modified in order to mitigate the condition. Abnormal or upset conditions are any conditions that cause an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. These conditions are identified by plant personnel or indicated by the process sensors (which send signals to the CON through the PLCs). After conditions are identified, the CON issues an emergency stop command to the BDS. When this command is issued, the BDS machine components are stopped.

14.3.2.12 Extended Shutdown

14.3.2.12.1 The BDS operating procedures do not include specific steps to shut down the system for extended periods. Instead, normal shutdown procedures are followed when the BDS machines are not being used. Shutdown procedures are implemented after the BDS is parked as explained earlier.

14.3.2.13 Maintenance

14.3.2.13.1 Maintenance of the BDS machine includes preventive maintenance procedures and corrective maintenance procedures. Preventive maintenance procedures generally involve inspections, cleaning (as required), and lubricating (as required) for the BDS machine.

14.3.3 Monitoring Procedures

14.3.3.1 Each BDS is equipped with sensors to detect the presence, position, and weight of munitions and bulk items during operations. The sensors, which are connected through PLCs, ensure that the munitions and bulk items will be processed safely by relaying information to the CON.

14.3.3.2 The CON monitors the operations of the BDS through the demilitarization operator consoles and CCTV. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provide operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into logbooks.

14.3.3.3 The MPB is a Category A room, and it is expected that this area will be contaminated by agent (liquid or vapor) as part of normal operations. ACAMSs are used to detect the presence of agent vapors in the MPB.

14.3.3.4 Waste Identification

14.3.3.4.1 As mentioned previously, waste munitions and bulk items are fully identified prior to entering the BDS. The quantity of munitions and bulk items processed by the BDS is recorded by the PDARS and maintained in a logbook by CON operators.

14.3.3.5 Waste Throughput

14.3.3.5.1 The waste entering the BDS is a bulk item. During treatment by the BDS, the agent is separated from the item and handled through the ACS. The metal casing is then transported away from the BDS for thermal treatment later in the MPF. In each case, quantification of waste occurs: the agent is quantified as a result of weighings that occur before and after the agent drain process, with the weights and their difference recorded on the PDARS and in the manual record; and the metal casing is quantified through the PDARS record and by the manual record created by the CON operator who observes the BDS in operation.

14.3.4 Inspection

14.3.4.1 See Section 14.2.4.

14.3.5 Closure

14.3.5.1 Partial Closure

14.3.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the BDSs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; all clouded observation windows that compromise the ability to view operations shall be cleaned or replaced; and maintenance and repair will be performed, as necessary, on the machines and other room components. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure from Executive Secretary, the next campaign will commence when authorized and when it is appropriate to do so.

14.3.5.2 Final Closure

14.3.5.2.1 Final closure is addressed in Attachment 10 (Closure Plan).

14.3.6 Mitigative Design and Operating Standards

14.3.6.1 The BDS machines are designed for demilitarization purposes and do not contain inherent components to mitigate the potential for waste migration to the environment. However, the MPB was designed for this purpose. The MPB will be operated in a manner to reduce the risk of waste constituent migration to the environment.

14.3.6.2 The floor of the MPB is impervious and sloped to drain any spills to sumps located in the floor. Protective clothing is mandatory during cleanup of spilled agent in the room, and care is taken to reduce the potential for spills.

14.3.6.3 The MPB will not contain explosively configured munitions. Therefore, the room is not designed for, nor expected to incur, an explosion during munitions demilitarization. However, if an accident occurs, air from the MPB would be captured by the MDB ventilation filter system and not escape to the atmosphere.

14.3.7 Environmental Performance Standards for Miscellaneous Units

14.3.7.1 The BDS has been designed, installed, and will be operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. The following section describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.3.7.2 Miscellaneous Unit Wastes

14.3.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the BDS are associated with bombs and bulk item storage containers (such as ton containers). These wastes have been fully identified, and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.3.7.2.2 The maximum number of bulk items in the MPB at any time is equal to the number of munitions in eight cradles/trays (one cradle/tray per conveyor section). Therefore, up to eight MK-116 Weteye bombs, eight spray tanks, or eight ton containers could be in the MPB at one time.

14.3.7.2.3 The maximum volume of agent processed in the MPB is equivalent to the number of munitions in each cradle/tray at the BDS. For example, only one ton container may be processed at the BDS at a time. Therefore, during ton container processing, the maximum volume of waste at the BDS is equivalent to the agent in the ton container and the ton container itself. The maximum number of munitions and/or bulk items in the MPB that contain agent is equivalent to two cradle/trays (one per processing line).

Therefore, up to two MK-116 Weteye bombs, two spray tanks, or two ton containers containing agent could be at the BDS at one time. When bulk containers are processed using special handling procedures, the rinse materials generated from this operation are transferred from the MPB to the CSS and subsequently managed in accordance with Attachment 2 (Waste Analysis Plan).

14.3.7.3 Containment System

14.3.7.3.1 The seven sumps located in the MPB are primary containment sumps. Some of the sumps have trenches that aid in collecting spills. The dimensions of the sumps are approximately 2.75 by 2.75 by 2.38 feet (a total capacity of approximately 623 gallons not including the trench volume). The outer portion of each sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The sumps are constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The concrete is designed to be free from cracks or gaps.

14.3.7.3.2 Each sump metal internal liner is equipped with a level sensor probe to detect liquid. The level sensor is screwed into a coupling that is welded into the mounting flange of the metal liner. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner is sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for liquid detection within 24 hours of occurrence.

14.3.7.3.3 As mentioned previously, the maximum number of munitions filled with agent in the MPB at any time is:

14.3.7.3.3.1 Two MK-116 Weteye bombs
14.3.7.3.3.2 Two TMU-28/B spray tanks
14.3.7.3.3.3 Two ton containers.

14.3.7.3.4 Additional quantities of the above munitions or bulk items can be in the MPB at any given time; however, the maximum number of agent-containing bulk items is limited to those being processed at the BDSs. The maximum quantity of agent in munitions being processed is associated with the ton containers (two ton containers hold up to approximately 380 gallons of agent). In the event both ton containers leak or both are ruptured and all the agent spills onto the floor of the MPB, the sumps will be able to hold all the spilled liquid.

14.3.7.3.5 Material in the sumps will be removed within 24 hours of detection. The liner will then be decontaminated, as necessary, and rinsed. All rinsing materials will be collected and transferred to the SDS.

14.3.7.3.6 In addition to the sumps, the MPB contains curbed walls so that liquid spills and decontamination solution will not leak under doors and gates. The floors and walls are painted with epoxy chemical-agent resistant paints to aid in decontamination.

14.3.7.4 Site Air Conditions

14.3.7.4.1 See Section 14.2.7.4.

14.3.7.5 Topography

14.3.7.5.1 See Section 14.2.7.5.

14. 3.7.6 Meteorologic and Atmospheric Conditions

14. 3.7.6.1 See Section 14.2.7.6.

14.3.7.7 Air Quality

14.3.7.7.1 See Section 14.2.7.7.

14.3.7.8 Prevention of Air Emissions

14.3.7.8.1 See Section 14.2.7.8.

14.3.7.9 Operating Standards

14.3.7.9.1 The MPB is a Category A area and is under engineering controls at all times, as previously discussed. Liquid wastes are captured and controlled in the containment system, air emissions are controlled by the HVAC system and cleaned through filters, and the BDS operations are continuously monitored by the CON and PDARS. As a result, there is virtually no opportunity for the waste constituents to be released in such a way as to have adverse effects on human health or the environment due to migration into the outdoor environment. The liquids are placed in tanks or, if spilled, are contained in sumps and from there placed in tanks. Volatilized agent is captured by the HVAC system, primarily in carbon beds. The BDS itself is operated in a systematic and safe manner whether in automatic or manual mode, thereby reducing the potential for agent to be released and migrate into the air.

14.3.7.10 Site Hydrologic Conditions

14.3.7.10.1 See Section 14.2.7.10.

14.3.7.11 Migration of Waste Constituents

14.3.7.11.1 See Section 14.2.7.11.

14.4 PROJECTILE/MORTAR DISASSEMBLY MACHINE

14.4.1 Physical Characteristics

14.4.1.1 The PMD is part of the Projectile/Mortar Handling System (PHS). The PHS is designed to safely separate explosives and miscellaneous parts (fuze well cups, supplementary charges, cardboard spacers) from 105mm and 155mm projectiles, and 4.2-inch mortars. The PHS includes conveyors that transport the projectiles/mortars from the MDB UPA, through the ECV, to the ECRs where the PMDs are used to remove the explosive components from the projectiles/mortars. Next, the explosive and miscellaneous components are fed into the DFS for thermal destruction, and the projectile/mortar bodies are transferred to the MDM for chemical agent removal. After the chemical agent is removed, the projectile/mortar bodies are thermally treated in the MPF. Finally, the drained chemical agent is incinerated in one of the two LICs.

14.4.1.2 The PHS consists of two identical process lines designed to operate simultaneously. Both projectile/mortar processing lines (A and B) are located on the second floor of the MDB. Each line consists of several conveyors and a PMD. The Projectile Feed Conveyors and Projectile Discharge Conveyors for process lines A and B will be included with the discussion of the PMD. These conveyors are not considered part of the PMD, but they are included because they represent the beginning and end of the PMD treatment process.

14.4.1.3 <u>Equipment Installation</u>

14.4.1.3.1 The equipment that constitutes the PMD-101 has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the PMD equipment has been installed in accordance with the equipment's design specifications and drawings, as stated in this Permit.

14.4.1.4 <u>Dimensions and Location</u>

14.4.1.4.1 The approximate size of the PMD is 13 feet long by 11 feet wide by seven feet high. Most of the machine components are nickel-plated, and others are coated with a corrosion resistant epoxy paint to protect against the corrosive action of the decontamination solutions used at the facility.

14.4.1.4.2 The PMDs are located inside ECRs A and B. To provide effective containment in the event of any spills, leaks, or explosions, the ECRs have been equipped with blast doors and blast gates that remain closed while operations are taking place. Furthermore, each ECR is provided with a containment sump, and the air from the rooms is cycled through a closed ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, each ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene. To ensure that this design limit is not exceeded, the number of munitions in the ECR is limited. See Table 14-4-1[4] for the maximum number of munitions allowed into the ECR.

14.4.1.5 <u>Conveyors</u>

14.4.1.5.1 The projectile feed conveyors are made of steel and have dimensions of approximately 4.75 feet long and 1.33 feet wide. The projectile discharge conveyors are also made of steel and have dimensions of approximately 11.13 feet long and 1.33 feet wide.

14.4.1.5.2 For process line A, the projectile feed conveyor and the projectile discharge conveyor are located inside ECR A. For process line B, the projectile feed conveyor and the projectile discharge conveyor are located inside ECR B.

14.4.1.6 <u>Gates</u>

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[4] All tables are located at the end of this Attachment.

14.4.1.6.1 The projectiles/mortars are transferred automatically from the ECV into ECR A or B through munition access blast gates. After the projectiles/mortars are processed by the PMDs, they are transferred out of ECR A or B through a discharge blast gate. These gates will not close until a projectile/mortar is transferred completely into or out of the ECRs.

14.4.1.7 <u>Pumps and Transfer Lines</u>

14.4.1.7.1 PMDs do not drain the chemical agent out of the projectiles/mortars, thus there are no pumps or chemical agent transfer lines associated with the PMDs.

14.4.1.8 <u>Sump Pump</u>

14.4.1.8.1 See Section 14.2.1.10.

14.4.1.9 <u>Tanks and Containers</u>

14.4.1.9.1 There are no tanks or containers directly associated with the PMDs as they are being addressed in this Permit. Chemical agent is drained in the MDM and then pumped directly to the ACS.

14.4.1.10 <u>Feed System</u>

14.4.1.10.1 This section covers the feed system of one PHS; operation of the second system is identical. The feed rate of projectiles/mortars to the ECR varies according to the type and the amount of explosive fed to the DFS. One projectile/mortar system is coordinated with the other to ensure that the explosive limit of the DFS is not exceeded.

14.4.1.10.2 After confirmation of correct lot number and quantity of munitions, a signal is given to the UPA operator to load projectiles/mortars onto the UPA Projectile/Mortar Feed Conveyor. When this operation is complete, the operator signals the CON system and CON operator that loading is complete. The CON operator then initiates the start of processing the projectile/mortar.

14.4.1.10.3 The following conditions must be met before commencement of operation:

14.4.1.10.3.1 Feed conveyors are continuously running
14.4.1.10.3.2 Stops on the conveyors are retracted
14.4.1.10.3.3 ECR munition access blast gate is open.

14.4.1.10.4 When these have been confirmed, the orientation of the projectile/mortar is checked. If it is found that the projectile/mortar was loaded backwards, the UPA operator will reload the projectile/mortar in the correct orientation. The projectile/mortar is conveyed onto the feeder in the ECR. The feeder loads the projectile/mortar onto the Index Table, and the table is rotated. At this time a second projectile/mortar, if properly oriented, is loaded onto the conveyor system and is conveyed into the ECR to be loaded onto the Index Table. At this point, the munition access blast gate closes and the first operation of the explosive removal process commences.

14.4.1.11 Instrumentation

14.4.1.11.1 The PMD is operated by PLCs. The PLCs contain the controls and instruments for the PMD but are not a part of the machine. All the instrumentation installed on the machine is designed to relay information to the PLC. Also, the machine can be operated locally by setting the machines in the local mode from the PLC.

14.4.1.11.2 There is a variety of sensors installed to support the operation of the PMDs. The sensors are used to track process flow through the machine and continually update the PLC with new information. Those types of sensors include inductive proximity sensors (used to track munition movement throughout the process and to indicate the switches) and fiber-optic switches. The sensors are used to track movement throughout the process and to indicate cylinder or actuator position. A list of those sensors, their type, and a brief description of their function is provided in Table 14-4-2.

14.4.1.12 Electrical System

14.4.1.12.1 See Section 14.2.1.16.

14.4.1.13 Heating, Ventilation, and Air Conditioning System (HVAC)

14.4.1.13.1 See Section 14.2.1.17.

14.4.1.14 Fire Protection System

14.4.1.14.1 See Section 14.2.1.18.

14.4.1.15 Alarm and Communication Systems

14.4.1.15.1 See Section 14.2.1.19.

14.4.2 Operations and Maintenance

14.4.2.1 There are two systems that process non-leaking projectiles/mortars prior to the incineration. These systems operate in parallel, each in its own ECR. This description covers the operation of one processing system. Operation of the second system is identical. Either line is capable of meeting the maximum feed rate of the DFS, and the two lines are coordinated with each other. Pallets containing leaking projectiles/mortars are handled similarly to pallets without leakers, except that for sealed[5] ONCs determined, via ACAMS monitoring, to have agent levels greater than 40 TWA, munition unpacking occurs in the TMA. The process description for leaking munitions can be found in Attachment 9 (Contingency Plan).

14.4.2.2 General System Operation

14.4.2.2.1 The PMD is located in the ECR and is comprised of five major work stations: the Infeed/Transfer Station (IS), Nose Closure Removal Station (NCRS), Miscellaneous Parts

[5]The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

Removal Station (MPRS), Burster Removal Station (BRS), and Discharge/Output Station (DS).

14.4.2.2.2 The feed of projectiles/mortars to the PMD is described in Section 14.4.1.10, "Feed System." After a projectile/mortar is successfully transferred into the ECR, the projectile feed conveyor transfers the projectile/mortar to the PMD's infeed conveyor for disassembly. The PMD infeed conveyor then transfers the projectile/mortar to the IS on the PMD Index Table and the table is rotated to the NCRS. The NCRS removes the nose closure or fuze and burster when processing mortars. Then, the Index Table rotates the projectile/mortar to the MPRS where the supplementary charge and miscellaneous parts (if any) are removed. After the operation at the MPRS is completed, the Index Table rotates to the BRS where the burster of the projectile is removed by differential air pressure. The Index Table then rotates again to the DS where the projectile/mortar is removed from the PMD by the projectile discharge conveyor. The projectile/mortar is transported from the PMD to the discharge blast gate and stop. The munition discharge blast gate opens and the stops holding the munition are retracted, allowing the projectile without explosives to transfer out of the ECR and the next projectile/mortar to travel inside the ECR.

14.4.2.2.3 The nose closure or fuze, miscellaneous parts, and the supplementary charge are deposited onto the miscellaneous parts conveyor which transfers them to the DFS feed gate for thermal destruction. The bursters are conveyed to the Burster Size Reduction Machine (BSRM).

14.4.2.2.4 Except as noted below for bursters from 4.2-inch mortars and 105-mm projectiles, it is necessary to shear the bursters into sections due to the amount of explosive material contained in each burster and the fact that the bursters are contained. This allows the burster to burn instead of exploding inside the DFS. For this operation, the RSM is modified to perform as a BSRM. The RSM is adapted to receive each of the various sizes of bursters from the projectiles. Water-cooled shear blades cut the burster into pieces that fall into the DFS feed gates. Since the burster on the 4.2-inch mortar is relatively small in comparison to projectiles, and since it is open at one end, it does not require this reduction operation. Likewise, the 105-mm burster is open at one end and does not require this reduction operation. However, as a precautionary measure, TOCDF will attempt to cut 105-mm projectile bursters.

14.4.2.3 <u>Setup Procedures</u>

14.4.2.3.1 Automatic operation is the preferred mode for the startup, shutdown, and emergency shutdown of the PMDs and is to be used when possible for all operations. When the system is in automatic and remote manual from the Control Room mode, all system interlocks are automatic, causing the system to fail safe should an abnormal or upset condition occur. Both A and B lines have the same startup, shutdown, and emergency shutdown procedures. Before the startup procedures can begin, the operator must ensure the following systems are operable and online: DFS, DFS PAS, Decontamination System, SDS, Process Water System, Cooling Water System, Instrument Air System, Uninterruptible Power Supply System, Plant Air System, Secondary Power System, Primary Power System, Emergency Generator System, MDB HVAC System, ACS, and CON Console Operations.

14.4.2.4 System Startup

14.4.2.4.1 The procedures for PMDs startup are contained in the appropriate PMD system standard operating procedures document. In summary, the systems are started by selecting the type of agent and the type of munition to be processed and placing the PMD stations in automatic mode. This is done remotely by the CON operators. Before operations are commenced, a receiving tray is staged in the Upper Munitions Corridor on the Bypass Conveyor (this is where the munitions are sent after treatment at the PMD). Once these steps are performed, the PMDs are ready to begin treating munitions.

14.4.2.5 Feed

14.4.2.5.1 Prior to the projectiles/mortars arriving at the blast gate (located between the ECV and ECR and leading to the projectile input conveyor), the projectiles/mortars are identified in the storage igloo, placed in an Onsite Container (ONC) along with their pallet, transported to the Container Handling Building (CHB), and moved to the UPA where the ONC is monitored for chemical agent. If chemical agent is detected, via ACAMS monitoring, inside the ONC, at levels less than or equal to 40 TWA, the ONC is opened, the pallet is moved out into the UPA and unpacked. For nonburstered projectiles, the nose plug is either: (1) removed manually in the Upper Munitions Corridor after the munitions are loaded onto trays and the trays are transferred to the bypass conveyor and moved to the Upper Munitions Corridor. Trays are delivered to the MPB for further processing through the MDM following nose plug removal; (2) removed at the PMD; (3) removed at the MDM. For burstered projectiles and mortars, the UPA operator loads the projectile/mortar onto the UPA Projectile/Mortar Feed Conveyor. If the projectile/mortar is correctly oriented, it is then transported to the blast gate leading to the PMD. During that process, appropriate inspections and paperwork are completed to satisfy the various requirements associated with the Army Surety Program, the CWC, and hazardous waste identification and tracking requirements. Waste quantification requirements are met when the chemical agent is drained from the projectile/mortar at the MDM and pumped to the AQS. These various activities are recorded either manually, or by the PDARS, and such records will be available for scrutiny in the facility operating record.

14.4.2.6 Interlock Processes

14.4.2.6.1 The PMDs are operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the PMDs neither interfere with each other, nor operate in a manner that is unsafe to human life and health or unprotective of the environment. The interlocks are ZS-139/239, 1-P1, 2-P1, and ZS-147/247. Interlocks ZS-139/239 are described in this section, 1-P1 and 2-P1 are described in Section14.4.2.7, and ZS-147/247 are described in Section 14.4.2.11. The interlocks remain in place during manual operation and also prevent operator error that could result in the machine being operated in an unsafe or unprotective manner. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.4.2.6.2 When a projectile/mortar stops just before it enters the ECR, the munition access blast gate will open and the projectile/mortar will be conveyed into the ECR. An infrared retro-reflector sensor (ZS-139 and ZS-239, for lines A and B, respectively) detects the projectile/mortar while it is passing through the blast gate. The sensor is interlocked with the munition access blast gate so that the gate remains open until the entire projectile/mortar has successfully passed through the munition access blast gate and enters the ECR.

14.4.2.6.3 Once the projectile/mortar enters the ECR, it is processed by the PMD. The projectile/mortar entering from the blast gate is transferred to the projectile feed conveyor. The projectile feed conveyor moves the projectile/mortar to the PMD Infeed/Transfer Station.

14.4.2.7 Infeed/Transfer Station

14.4.2.7.1 A sensor on the infeed conveyor (1-P1 and 2-P1, for lines A and B, respectively) detects the presence of the projectile/mortar. This sensor is interlocked with the munition access blast gate. The munition access blast gate will close when the sensor detects the projectile/mortar on the infeed conveyor. The infeed conveyor moves the projectile/mortar near the saddle on the Index Table. From this position, the Transfer Conveyor Pusher contacts the projectile/mortar and pushes it onto the saddle. The Index Table then rotates clockwise to bring the projectile/mortar to the NCRS.

14.4.2.8 Nose Closure Removal Station (NCRS)

14.4.2.8.1 The NCRS is the number 2 processing station on the PMD. The NCRS is used to remove the nose closure or fuze from projectiles and fuzes and bursters from mortars. When a projectile/mortar is detected in the NCRS by sensor P2, the projectile is clamped. A hydraulic chuck engages and unscrews the components. The components are removed from each type of projectile/mortar as follows:

Projectile/Mortar	Removal Process
105mm	The nose plug or fuze is unscrewed and removed.
155mm	The nose closure is unscrewed and removed.
Mortars	The fuze and burster are unscrewed and removed as one unit since they are screwed together; therefore, the hydraulic chuck is needed to separate the fuze from the burster.

14.4.2.8.2 All components from the NCRS are dropped onto the miscellaneous parts removal station conveyor. After the operation in the NCRS is completed, the station signals to the PLC that it is ready to index. The Index Table is then rotated clockwise to bring the projectile/mortar to the MPRS.

14.4.2.9 Miscellaneous Parts Removal Station (MPRS)

14.4.2.9.1 The MPRS removes the fuze well cup or supplemental charges from the projectiles. Not all projectiles have components that require removal at the MPRS station. Munitions that do not require any disassembly at this station [such as 105mm (M360) and 155mm (M121) projectiles and 4.2-inch (M2A1) mortars] will bypass it. When sensor P3 detects a projectile is present at the MPRS, the projectile hold-down cylinder and positioning cylinder extend. Then, the MPRS carriage moves forward to remove the components from the following types of projectiles:

Projectile	Removal Process
155mm	The screw type fuze well cups from M110 projectiles are removed.
155mm	A magnet on the MPRS is used to remove the supplementary charge from the M121A1 projectiles.

14.4.2.9.2 Components that have been removed are deposited on the MPRS conveyor. The MPRS conveyor discharges all parts onto the DFS feed gate, from which they are sequenced into the DFS.

14.4.2.10 Burster Removal Station (BRS)

14.4.2.10.1 The BRS is the next station to process the projectiles after the MPRS. The BRS is used to remove bursters from projectiles with the use of high pressure air. The 4.2-inch mortars are not processed by the station. The operation begins when a projectile is sensed by the P4 sensor. The projectile positioning cylinder extends. Then the BRS carriage moves forward, and a delta-P head assembly contacts the projectile. High pressure air (approximately 100 - 300 pounds per square inch) is applied to the head of the projectile. The differential pressure causes the burster to separate from the projectile, and the BRS carriage retracts with the burster. A gripper transfers the burster to a conveyor which in turn transfers the burster to the BSRM. The BSRM shears the burster into sections and feeds them to the DFS.

14.4.2.11 Discharge/Output Station (DS)

14.4.2.11.1 The projectile will be rotated to the DS after its burster is removed at the BRS. The 4.2-inch mortars bypass the MPRS and BRS enroute to the DS. The DS transfers the projectile/mortar to the projectile discharge conveyor. This is accomplished using the PMD transfer conveyor pusher. The projectile discharge conveyor transfers the projectile/mortar to the discharge blast gate. Sensor ZS-147 or ZS-247, for line A or line B, respectively, is interlocked with the discharge blast gate. The sensor allows the discharge blast gate to open and keeps it open until the projectile/mortar has successfully passed out of the ECR.

14.4.2.11.2 After the projectile/mortar exits the ECR, it is tilted to the upright position. A burster detection system, located at the Projectile Output Conveyor discharge stop in the Upper Munition Corridor, checks the projectile to verify that the burster has been removed. If a burster is detected in the projectile, the Multi-position Loader (MPL) will not transfer the projectile to the munitions tray. The projectile with the detected burster will be loaded onto the reject table by the MPL. The reject tables are located next to the Projectile Output Conveyor discharge stop. They can each hold a maximum of four projectiles. Any rejected projectiles will be removed manually by an operator in appropriate PPE. The projectiles are then loaded onto an empty munitions tray by the MPL. The loaded tray will be transported into the MPB, and the projectiles/mortars will be processed by the MDM.

14.4.2.12 System Shutdown (Normal)

14.4.2.12.1 Normal shutdown of the PMDs is done in accordance with standard operating procedures. The system must be first clear of all munitions. The CON operators then issue “stop” and “park” commands to the system. The equipment is placed in home position at this time.

14.4.2.13 Emergency Shutdown

14.4.2.13.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition may include any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.4.2.14 Extended Shutdown

14.4.2.14.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation, or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the PMD systems have been parked. The extended shutdown procedures are implemented during agent campaign changeover.

14.4.2.15 Maintenance

14.4.2.15.1 To ensure that the PMDs are in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the PMDs will be systematically subjected to preventive maintenance inspections.

14.4.3 Monitoring Procedures

14.4.3.1 Each PMD is equipped with several types of sensors to detect the presence and position of projectiles/mortars during operation. These sensors ensure that the projectiles/mortars will be processed safely by relaying information to the PLC. The functions of these sensors are described in Section 14.4.1.11, “Instrumentation”, and summarized in Table 14-4-2.

14.4.3.2 The CON operators monitor the operations of the PMDs through the demilitarization operator consoles and CCTVs. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provides operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements.

14.4.3.3 In addition, the CON operators and outside operators are required to log the events that occur during their shift into their respective logbooks.

14.4.3.4 Chemical agent released in the ECRs will be contained by the sumps or controlled by the HVAC system. ACAMSs are used to monitor for the presence of agent in the ECRs and the ECV.

14.4.3.5 Fire monitoring is described in Section 14.2.1.18, “Fire Protection”.

14.4.3.6 Waste Identification

14.4.3.6.1 By the time a projectile/mortar reaches the PMD, it will have been fully identified per Attachment 2 (Waste Analysis Plan).

14.4.3.7 Waste Throughput

14.4.3.7.1 When a projectile/mortar arrives at the PMD, its nose closure or fuze is removed. Then the supplementary charge or miscellaneous parts (if any) are removed. The next station removes the burster by differential air pressure. The projectiles/mortars are quantified by the PDARS and by the manual record created by the CON operator who observes the PMD in operation.

14.4.4 Inspection

14.4.4.1 See Section 14.2.4.

14.4.5 Closure

14.4.5.1 Partial Closure

14.4.5.1.1 See Section 14.2.5.1.

14.4.5.2 Final Closure

14.4.5.2.1 See Section 14.2.5.2.

14.4.6 Mitigative Design and Operating Standards

14.4.6.1 The ECR is a room where explosives or propellants could potentially be ignited. The design and operating plans for the ECR have been carefully prepared to anticipate this type of mishap. For example, as a worst-case situation, the operating plan limits the total amount of explosives or propellants that are present in the room at any one time so that in the event of an accidental ignition, the ECR could contain the reaction.

14.4.6.2 Protective systems in the ECR include an industrial-type, automatically activated fire sprinkler system. Also, water and decontamination solution outlets are available within the room for final manual wash-down and area cleanup. The floor of the room is sloped to drain to a sump, and the sump de-watering system transfers the collected liquid to the SDS for disposal in one of the two LICs. Protective clothing is mandatory during cleanup of explosive and propellant residues in the room, and care is taken to reduce the potential for residues.

14.4.6.3 If an explosion occurs in a containment room, it is expected that a portion of the agent will be combusted while the remainder will exist in a vapor or liquid form. In the ECR, the agent vapors will be contained in the room because both the blast valves and the leak-tight dampers will be closed. The blast valves will remain closed until the pressure decays to the point where the spring force is greater than the room pressure (0.5 pounds per square inch). At this pressure, the blast valve will open, but the leak-tight damper will continue to contain the gases. The leak-tight dampers will not be opened until the room gas pressure has decayed to approximately atmospheric pressure.

14.4.6.4 The ECR is completely surrounded by rooms that are ventilated to the filter system. Therefore, any leakage out of the ECR as a result of a blast will be vented to the filter system.

14.4.6.5 Liquid agent in the ECR resulting from an explosion will be collected in the ECR sump. Because of the limited number of munitions that will be in the ECR at any one time, the amount of liquid agent released by an explosion is not expected to be greater than about two gallons. Once ventilation has been reestablished in the ECR (by reopening the gas-tight valves), DPE entries will be made, and the area will be hosed down with decontamination solutions. Sufficient decontamination solution will be used to ensure complete neutralization of the agent. The resulting solution will then be pumped to the SDS for later disposal in the LICs.

14.4.6.6 If DPE entry to the ECR is required after processing projectiles/mortars and explosives may be present, the DPE Team shall thoroughly wet each other’s DPE and the ECR floor (where they will be working) immediately prior to entering the ECR, to preclude the possibility of static discharge. A water hose is available at the decontamination station by the access door to each ECR.

14.4.7 Environmental Performance Standards for Miscellaneous Units

14.4.7.1 The PMDs have been designed, installed, and will be operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.4.7.2 describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.4.7.2 Miscellaneous Unit Wastes

14.4.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the PMDs include 105mm and 155mm projectiles and 4.2-inch mortars. These wastes have been fully identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan). The maximum volumes of wastes that will be allowed into the ECR at one time are listed in Table 14-4-1.

14.4.7.2.2 The energetics and chemical agent wastes will be incinerated. The nose closure or fuze and burster removed from the projectiles/mortars will be incinerated in the DFS. The chemical agent will be drained by the MDMs and then incinerated in the LICs. The projectile nose plugs and drained projectiles/mortars will be sent to the MPF.

14.4.7.3 Containment System

14.4.7.3.1 See Section 14.2.7.3.

14.4.7.4 Site Air Conditions

14.4.7.4.1 See Section 14.2.7.4.

14.4.7.5 Topography

14.4.7.5.1 See Section 14.2.7.5.

14.4.7.6 Meteorologic and Atmospheric Conditions

14.4.7.6.1 See Section 14.2.7.6.

14.4.7.7 Air Quality

14.4.7.7.1 See Section 14.2.7.7.

14.4.7.8 Prevention of Air Emissions

14.4.7.8.1 See Section 14.2.7.8.

14.4.7.9 Operating Standards

14.4.7.9.1 Based on the above, chemical agent is assumed to be the pollutant of concern from the PMDs with respect to air emissions.

14.4.7.9.2 Chemical agent emissions from the PMDs will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to the 120-foot HVAC stack.

14.4.7.9.3 The PMDs are located in the ECRs within the MDB. The ECRs are maintained at approximately -2 inches of water column. These two rooms are maintained at the lowest pressures within the MDB so that all air emissions from the PMDs during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.4.7.9.4 Attachment 5 (Inspection Plan) covers the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect chemical agent, and to determine loss of blower performance.

14.4.7.10 Site Hydrologic Conditions

14.4.7.10.1 See Section 14.2.7.10.

14.4.7.11 Migration of Waste Constituents

14.4.7.11.1 See Section 14.2.7.11.

14.5. MULTIPURPOSE DEMILITARIZATION AND PICK AND PLACE MACHINES

14.5.1 Physical Characteristics

14.5.1.1 The TOCDF MDMs are designed to remove burster wells and drain chemical agent from 105mm and 155mm projectiles and 4.2-inch mortar cartridges. The emptied munitions and projectile nose plugs are sent to the MPF for thermal treatment. The chemical agent is collected by the ACS, a separate system that includes the AQS, agent holding tanks, associated pumps, valves, piping, and other ancillary equipment. The agent is then sent to one of the LICs.

14.5.1.2 There are three MDMs in the MPB. Associated with each MDM is a PPM. The PPMs are robotic systems designed to transfer one munition at a time from the munitions trays to the MDMs and then back to the munitions trays. The PPMs do not perform demilitarization operations but are an integral part of the MDM demilitarization process. Therefore, information about them is included in this Permit.

14.5.1.3 For purposes of defining the MDMs, they are considered to begin and end at the pick and place robot loader. The loader is the part of the PPM that removes munitions from the munitions tray. The demilitarization process begins when the munitions tray arrives at the appropriate location in the MPB, as determined by an electronic sensor, and the pick and place loader selects and removes a munition from the tray. The demilitarization process ends, with respect to the MDM, when the pick and place loader retrieves the munition from the MDM and returns it to the tray.

14.5.1.4 The MDMs process munitions that are not configured with explosives, propellants, or other energetics, so the processing system is only concerned with separating the chemical agent from the munition [the explosives, propellants, and energetics are removed in the ECR by the PMD]. The MDMs are similar to the PMDs in that the munitions are placed on an indexing tray that rotates the munitions from one processing station to the next. Each station is designed to perform a different operation. The munitions enter and leave the MDM from the same station (i.e., Load/Unload Station). The following munitions are processed on the MDMs:

14.5.1.4.1 M121, 155mm Projectiles (containing GB)
14.5.1.4.2 M121A1, 155mm Projectiles (VX, GB)
14.5.1.4.3 M104, 155mm Projectiles (H)
14.5.1.4.4 M110, 155mm Projectiles (H)
14.5.1.4.5 M122, 155mm Projectiles (GB)
14.5.1.4.6 M360, 105mm Projectiles (GB)
14.5.1.4.7 M2, 4.2-inch Mortar Cartridges (HT)
14.5.1.4.8 M2A1, 4.2-inch Mortar Cartridges (HD).

14.5.1.5 Equipment Installation

14.5.1.5.1 The equipment that constitutes the MDMs and PPMs has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Condition I.S. This Certification attests that the MDM/PPM processing system equipment has been installed in accordance with the equipment's design specification and drawings, as stated in the Permit. Information about the Certification documentation is referenced herein to avoid duplication in this Permit.

14.5.1.6 Dimensions and Location

14.5.1.6.1 The PPMs straddle the MDMs as well as each conveyor line (Line A and Line B) in the MPB. The width of the PPMs is approximately 35 feet. The height to the centerline of the mast, which supports the pick and place robot loader carriage, is approximately 12 feet. The height to the top of the carriage is approximately 15 feet.

14.5.1.6.2 The MDMs and PPMs are located on the second floor of the MDB in the MPB.

14.5.1.7 Conveyors

14.5.1.7.1 Munitions are transported to the MDMs using Line A and Line B conveyor systems. Each line is composed of three conveyors. The conveyors automatically transport munitions trays to the correct location for pick and place operations. Various sensors located along the conveyor rails detect the presence of munitions trays, adjust the tray speed, and stop the trays as needed.

14.5.1.8 Gates

14.5.1.8.1 The munitions trays are transferred automatically from the Upper Munitions Corridor into the MPB through one of the two MPB gates. These gates are opened to receive munitions. The gates are not interlocked with the MDMs or PPMs, but they are interlocked with sensors that detect the presence of a munitions tray beneath the gate (see Section 14.5.2.6, "Interlock Processes").

14.5.1.9 Pump and Transfer Lines

14.5.1.9.1 The MDMs are equipped with pumps to remove agent from the munitions. The agent is transferred by a pump from the munitions through lines connecting the pumps to the ACS. The ACS storage tanks are located in the MDB.

14.5.1.10 Tanks and Containers

14.5.1.10.1 There are no tanks or containers directly associated with the MDMs for the processes addressed in this Permit. However, there is a tank on each MDM that is part of the AQS, which is part of the ACS. The tank associated with the MDMs is either a 1.5-inch or 3-inch diameter tank. The 3-inch diameter tanks are used during processing of 105 mm projectiles, 155mm projectiles and 4.2 inch mortars, while the 1.5-inch tanks are also used during processing of 105mm projectiles.

14.5.1.11 Feed System

14.5.1.11.1 The PPMs are the waste feed system for the MDMs. The PPMs are fully automated (or manually operated) robotic systems that move waste munitions to the MDMs for processing and then return them to the munitions trays. Agent removed from munitions at the MDM is collected by the AQS and sent to the LICs. In addition, the processed munitions are fed to the MPF for thermal treatment.

14.5.1.11.2 As will be discussed in later sections, the PPM is connected to the PDARS that records the number of munitions processed by the MDMs. The rate at which waste munitions are fed to the MDM depends on the type of munition (only one type of munition is processed at a time). The MDMs can hold up to six munitions of the same caliber and fill-type at a time. Processing time varies depending primarily on the time it takes to drain the various size munitions and load/unload them.

14.5.1.12 Instrumentation

14.5.1.12.1 Instruments associated with the MDMs are remotely monitored in the TOCDF CON. The instruments are primarily associated with the hydraulic and pneumatic systems, electronic position sensors, drain verification system, and interlocks. The sensors provide input to the programmable logic controllers (PLC) for automatic processing of various munitions. The PLCs, in turn, control the automatic function of the various MDM instruments.

14.5.1.12.2 Table 14-5-1[6] summarizes the various sensors for the MDM and their functions. The instruments, and their tag numbers, are shown on drawings contained in Attachment 11 (General Facility Drawings).

14.5.1.13 Electrical System

[6] All tables are located at the end of this Attachment.

14.5.1.13.1 See Section 14.2.1.16.

14.5.1.14 Heating, Ventilation, and Air Conditioning System (HVAC)

14.5.1.14.1 See Section 14.2.1.17.

14.5.1.15 Fire Protection System

14.5.1.15.1 See Section 14.3.1.14.

14.5.1.16 Alarm and Communication Systems

14.5.1.16.1 See paragraph 14.3.1.15.

14.5.2 Operations and Maintenance

14.5.2.1 After the explosive components of the munitions have been removed in the ECR, trays of munitions are transported by the Charge Car, located in the Upper Munitions Corridor, to the MDMs in the MPB via the Line A or Line B MPB feed conveyors. The MDMs and PPMs are fully automated but can be operated manually (remotely or locally controlled), if required. A brief description of the MDMs and PPMs operation is contained in the following sections.

14.5.2.2 General System Operation

14.5.2.2.1 Each of the three MDMs can be operated separately, in conjunction with either of the other two MDMs, or simultaneously with both of the other two MDMs.

14.5.2.2.2 Prior to startup, the CON operators execute a series of computer commands to initiate the MDMs and PPMs. To begin MDM operations, the operators in the CON then issue a "start" command. The initiation and startup procedures, respectively, are described in the next sections.

14.5.2.2.3 The trays come into the MPB through the MPB gates after being processed in the ECR (see Section 14.4 for ECR demilitarization machine operations). The CON operators use the CCTVs to verify that a munitions tray has arrived at the correct conveyor location for pick and place operations and also to verify the number of munitions in each tray. The number of munitions is recorded in a logbook.

14.5.2.2.4 The PPM selects a munition and lifts it from the munitions tray. The munition is carried to MDM Station 1 (Load/Unload Station), which serves as the delivery point for munitions entering the MDM and as the pickup point for munitions exiting the MDM. Several electronic sensors are used to monitor the presence of munitions at each MDM station (see Section 14.5.2.6 for a description of these sensors). Each munition is placed in the station vertically with the base down and the nose up.

14.5.2.2.5 The first munition delivered to the MDM is rotated to Station 2, and another munition is retrieved by the PPM and delivered to the Load/Unload Station. Then both munitions are rotated so that the first munition goes to Station 3 and the second moves to Station 2.

Another munition is placed in the Load/Unload Station and the table is rotated again. Eventually, the MDM is operated so that all six stations have a munition (except when the munitions tray does not have enough remaining unprocessed munitions to deliver to the MDM). Stations 2 and 3 do not perform any operations.

14.5.2.2.6 Station 4 is normally used as the Bore Station. It is designed to bore out welded or stuck burster wells. This station is not expected to be used very frequently because most of the munition burster wells were assembled with the press fit method. If a munition requires boring, a clamp cylinder extends and holds the munition in place while the boring head (consisting of an appropriately sized spade drill bit) bores vertically down through the top of the munition. The bore head is raised and lowered by a feed cylinder that contains the bore head drill and motor and is mounted on four vertically-mounted bolster rods. As an alternative, this position can also be configured as a Nose Closure Removal/Burster Detection Station, which may be used to process projectiles received at the TOCDF without bursters. At this station, the nose plugs will be removed and the absence of a burster will be confirmed.

14.5.2.2.7 Station 5 is the Pull and Drain Station. It is designed to remove the burster well, thus providing access to the agent-filled cavity in the munition, and then to drain the agent from the munition. Upon entering Station 5, the munition is lifted slightly and held in place while the carriage assembly, which contains a collet assembly and pull cylinders, is lowered so that the collet assembly enters the munition. The collet expands to grip the burster well, and the pull cylinders extend to raise the collet assembly and the burster well from the munition.

14.5.2.2.8 After the burster well is removed from the munition, the munition is shifted horizontally into the Drain Station position. A drain tube, which consists of a straight, hollow, steel tube, is lowered into the munition, and the ACS removes the agent from the munition. Under normal operations, it is expected that some of the agent will not be removed by this process. After draining the munition, the drain tube is retracted, the munition returns to the Pull Station, and the burster well is placed back in the munition (or, for some munition types, it is dropped into the burster well chute). Station 5 contains a drip pan to collect residual agent that may drip from the burster well and agent drain tube.

14.5.2.2.9 Station 6 is the Crimp Station. It is designed to remove the burster well from the munition and crimp it. Crimping the burster well deforms it so that it no longer seats completely in the munition when replaced. The resulting gap between the burster well and the agent cavity allows a more thorough thermal combustion of the agent heel in the MPF. The burster well is removed from the munition by the burster well gripper assembly. The burster well crimp jaw closes around the burster and deforms it. A strip cylinder is used to remove the burster well from the gripper assembly, where it may become stuck during compression.

14.5.2.2.10 The munition is rotated to Station 1 after it is drained and the crimped burster well is placed back into the munition (except for those munitions where the burster well is discarded at Station 5). A burster well detector sensor located at Station 1 checks for the presence of a burster well. If a burster well is not detected, the PPM places the munition on the reject table. If a burster well is detected, the munition is removed by the PPM and placed back in the munitions tray. The PPM straddles both conveyor lines so that, if needed, the MDMs could be fed from either line. The MDMs are not currently designed to feed munitions from one munitions tray on Line A, for example, and place it in a different munitions tray on Line B. The system is only designed to pick and place munitions from the same munitions tray on the same conveyor line.

14.5.2.3 Setup Procedures

14.5.2.3.1 The MDMs are initialized before being placed in service. All major system components are remotely activated from the CON, and the PLCs verify the proper operation of the system. These systems include instrument air, plant air, hydraulics, ACS, and conveyors. The indicators in the CON are observed to verify the status of the MDMs and auxiliary systems. The MDM system initialization icon is selected and, after the flashing green icon turns steady green, the MDMs are ready to receive a start command from the CON.

14.5.2.4 System Startup

14.5.2.4.1 The startup of the MDMs consists of preparing the MPB conveyors, preparing the MDMs, and preparing the pick and place loader. The MDM/PPM startup procedures are described in the standard operating procedures document. In summary, the CON operators start the system by placing the equipment in automatic mode (which is done remotely from the CON) and issuing a start command to the Line A and Line B conveyors and MDMs/PPMs. An initialization command is issued before the machines are ready to receive munitions.

14.5.2.5 Feed

14.5.2.5.1 As discussed earlier, each munition is fed one at a time to the MDMs by the pick and place loader. The munitions arrive on a munitions tray with the head (top) of the munition pointing up toward the ceiling. The trays are referred to as “egg crates” because of the way the munitions are arranged in rows and columns on the tray. The munitions tray does not have to be completely filled for MDM operations.

14.5.2.5.2 The munitions tray is automatically adjusted by the conveyors into a pre-established position under the pick and place loader. The munitions tray is indexed forward (or backward) so that each row and column of munitions is accessible by the pick and place loader. This is done automatically, but the CON operators can also input a row/column designation so that the tray will be moved to a corresponding location on the conveyor. The CON operators record each munition that is loaded, unloaded, or rejected. In addition, the PDARS maintains a similar count for each munitions tray.

14.5.2.6 Interlock Processes

14.5.2.6.1 Conveyor Systems

14.5.2.6.1.1 The MDM conveyors are interlocked with the MDMs. That is, when the MDMs are processing munitions, the corresponding MDM conveyors will not automatically move the munitions tray to the next (or previous) conveyor. In addition, the individual conveyors are interlocked so that if two munitions trays are on the same line, the conveyors cannot be activated so that two munitions trays are sent to the same conveyor section. Tables 14-5-1 and 14-5-2 indicate the sensors on the MDMs and the conveyors.

14.5.2.6.1.2 The MPB Feed Conveyors are interlocked with the MPB gates so that when a munitions tray is entering the MPB, the gates cannot close. The sensors that interlock the gates are photoreflective sensors ZS-374 (Line A) and ZS-474 (Line B).

14.5.2.6.2 <u>Station 1: Load Station</u>

14.5.2.6.2.1 The PPM delivers munitions one at a time to and from the Load/Unload Station. This station has two sensors. Sensor X-101C (where X is a value of 1, 2, or 3 and refers to the specific MDM) checks for the presence of a munition at the Station, and sensor X-101D checks for the presence of a burster well before the pick and place loader lowers for pickup to discharge a drained projectile body. The MDM and PPM are interlocked so the MDM does not operate independently from the pick and place loader during loading or unloading operations.

14.5.2.6.3 <u>Station 2: Spare Station 1</u>

14.5.2.6.3.1 This station is a spare and does not have any sensors or interlocks. No demilitarization operations are conducted at this station.

14.5.2.6.4 <u>Station 3: Spare Station 2</u>

14.5.2.6.4.1 This station is a spare and does not have any sensors or interlocks. No demilitarization operations are conducted at this station.

14.5.2.6.5 <u>Station 4: Bore Station</u>

14.5.2.6.5.1 The Bore Station is normally bypassed unless the munitions lot is determined to have burster wells that are seal-welded. However, if the lot does include seal-welded burster wells, the Bore Station is enabled and is the first stop for the munition at the MDM.

14.5.2.6.5.2 The Bore Station has several sensors. Sensors 402A/B sense if the projectile clamp is extended or retracted, and sensor 404C indicates whether the munition is clamped. These sensors interlock the MDM Indexing Table and bore head. The bore will not start until the munition is clamped. In addition, sensors 403A/B, which sense the position of the bore head, also are interlocked with the MDM.

14.5.2.6.5.3 As an alternative, this position can also be configured as a Nose Closure Removal/Burster Detection Station which may be used to process projectiles received at the TOCDF without bursters. At this station, the nose plugs will be removed and the absence of a burster will be confirmed. Sensors 404A/B confirm the absence of a burster and activate an alarm if a burster is detected.

14.5.2.6.6 <u>Station 5: Pull and Drain Station</u>

14.5.2.6.6.1 The Pull and Drain Station is a two-step process. Step one is the removal of the burster well from the munition. Sensor X-504C on the Pull and Drain Station indicates whether the burster is removed from the munition.

14.5.2.6.6.2 Step two is the draining of agent. Sensors X-510A/B indicate whether the drain tube has been extended into the munition, and sensors X-506A/B indicate if the drip pan and burster well chute are in the correct place. Additional sensors indicate whether the various hydraulic cylinders are extended or retracted.

14.5.2.6.6.3 The Station 5 sensors are important because they interlock the MDM Index Table so that it does not rotate during operations. In fact, each Station must have completed its operation before the MDM Index Table will rotate the munitions to the next station.

14.5.2.6.7 Station 6: Crimp Station

14.5.2.6.7.1 The Crimp Station has two operations that depend on whether the burster well is removed and discarded at Station 5. A collet cylinder gripper (an expandable collet) enters the munition, and pressure sensor X-603C indicates the presence or absence of the burster well. An alarm will be sent to the CON if a burster well is present when it should have been discarded or if the burster well is absent when it should be present. If either condition exists, the munition is rejected and the pick and place loader will place the munition in the corresponding reject table, which can hold four 155 mm munitions, six 105 mm munitions, or six 4.2 inch mortars. For each MDM, there is one reject table (see Section 14.5.3.4 for more on waste throughput).

14.5.2.6.7.2 The remaining sensors at Station 6 indicate the position status of the various hydraulic cylinders. Station 6 sensors are important because they interlock the MDM Index Table so that it does not rotate during operation. When operations are completed at Station 6 and all other stations on the MDM have finished, the munition in Station 6 is rotated to Station 1.

14.5.2.6.8 Station 1: Unload Station

14.5.2.6.8.1 Sensor X-101D checks for the presence of a burster well before the pick and place loader lowers for pickup.

14.5.2.7 System Shutdown (Automatic, Normal)

14.5.2.7.1 Shutdown of the MDMs consists of stopping and “parking” the PPM loader, MDMs, and MPB conveyors. The pick and place loader is issued a command that places the carriage in its "home" position and lowers the loader (end effector) to its fail safe position. The MDMs are shut down only after the Index Tables are verified to be clear of munitions.

14.5.2.7.2 The MDM conveyors are shut down one line at a time (if both were being used for operations). Both lines must be clear of munitions trays before stopping the conveyor systems. The conveyors are issued a “stop” command, and the Line A and/or Line B icon turns to magenta to indicate that the MDM conveyors are no longer started. After these commands are completed, the MDM, PPM, and conveyors are “parked” and system components are in their home positions.

14.5.2.8 Emergency Shutdown

14.5.2.8.1 In the event of an abnormal or upset condition associated with the MDMs, PPMs, or MDM conveyors, the processing operations are modified in order to mitigate the condition. Abnormal or upset conditions are any conditions that cause an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. These conditions are identified by plant personnel or indicated by the process sensors (which send signals to the CON through the PLCs). After conditions are identified, the CON issues an emergency stop command to the MDM. When this command is issued, the MDM components are stopped.

14.5.2.9 Extended Shutdown

14.5.2.9.1 Extended shutdown procedures are in addition to normal shutdown procedures. Extended shutdown involves installing a spectacle blind in the agent line going to the Toxic Cubicle. This prevents backflushing and leakage of agent from the agent holding tanks.

14.5.2.10 Maintenance

14.5.2.10.1 Maintenance of the MDMs and PPMs includes preventive maintenance procedures and corrective maintenance procedures. Preventive maintenance procedures generally involve inspections, cleaning (as required), and lubricating (as required) of the MDMs and PPMs.

14.5.3 Monitoring Procedures

14.5.3.1 Each MDM is equipped with sensors to detect the presence, position, and configuration of each munition during operations. The sensors, which are connected through PLCs, ensure that the munitions are processed safely by relaying information to the CON. The locations and functions of these sensors are described in Tables 14-5-1 and 14-5-2.

14.5.3.2 The CON monitors the operations of the MDMs and PPMs through the demilitarization operator consoles and CCTV. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS acquires operational data for analysis and historical record keeping. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into their respective logbooks.

14.5.3.3 The MPB is a Category A room, and it is expected that this area will be contaminated by agent (liquid or vapor) as part of normal operations. ACAMSs are used to detect the presence of agent vapors in the MPB.

14.5.3.4 Waste Identification

14.5.3.4.1 As mentioned previously, waste munitions are identified prior to entering the MDMs. The quantity of munitions processed by the MDMs is recorded by the PDARS and confirmed visually by CON operators.

14.5.3.4 Waste Throughput

14.5.3.4.1 The waste entering the MDMs is an agent-filled munition. During treatment by the MDMs, the agent is separated from the munition and handled through the ACS. The metal casing is then returned to the munitions tray for thermal treatment in the MPF. In each case, quantification of waste occurs; the metal casing is quantified through the

PDARS record and by the manual record created by the CON operator who observes the MDM operations.

14.5.3.4.2 As mentioned previously, some munitions may be rejected by the MDMs. The MDM sensors are designed to detect "reject" munitions and notify the CON operators. These munitions are sent to the associated reject table which stands next to the MDM Index Table. These munitions are retrieved manually by plant personnel dressed in appropriate PPE. In every case, the quantity of munitions are recorded by the PDARS and the CON operators maintain a record in their logbooks.

14.5.4 Inspection

14.5.4.1 See Section 14.2.4.

14.5.5 Closure

14.5.5.1 Partial Closure

14.5.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the MDMs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; all clouded observation windows that compromise the ability to view operations shall be cleaned or replaced; and maintenance and repair will be performed, as necessary, on the machines and other room components. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure by the Executive Secretary, the next campaign will commence, when authorized, and when it is appropriate to do so.

14.5.5.2 Final Closure

14.5.5.2.1 Final closure is addressed in Attachment 10 (Closure Plan).

14.5.6 Mitigative Design and Operating Standards

14.5.6.1 The MDMs are designed for demilitarization purposes and do not contain inherent components to mitigate the potential for waste migration to the environment. However, the MPB was designed for this purpose. The MPB will be operated in a manner to reduce the risk of waste constituent migration to the environment, as explained below.

14.5.6.2 The floor of the MPB is impervious and sloped to drain any spills to sumps located in the floor. Protective clothing is mandatory during cleanup of spilled agent in the room, and care is taken to reduce the potential for spills.

14.5.6.3 The MPB will not contain explosively configured munitions. Therefore, the room is not designed for, nor expected to incur, an explosion during munitions demilitarization. However, if an accident occurs, air from the MPB would be captured by the MDB ventilation filter system and would not escape to the atmosphere.

14.5.7 Environmental Performance Standards for Miscellaneous Units

14.5.7.1 The MDMs have been designed, installed, and are operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. The following sections describe the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.5.7.2 <u>Miscellaneous Unit Wastes</u>

14.5.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the MDMs are associated with projectiles and mortar cartridges. These wastes have been fully identified, and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.5.7.2.2 The maximum volume of agent being processed at the MDMs is equivalent to the number of munitions at each MDM station where agent has not been removed. This is equivalent to five munitions at each MDM times three machines for a total of 15 munitions. This assumes each MDM is being utilized. The largest quantity of agent is associated with the M104 or M110 155mm projectiles (agent H), which were filled with 11.7 pounds of mustard. Thus, the total quantity of agent being processed on all three MDMs is 175.5 pounds. The MDMs do not generate additional hazardous waste except for waste decontamination solution.

14.5.7.3 <u>Containment System</u>

14.5.7.3.1 See paragraphs 14.3.7.3.1. and 14.3.7.3.2.

14.5.7.3.2 As mentioned previously, the maximum number of munitions (containing agent) in the MPB at any time during MDM operations is associated with five munitions trays. However, under normal operations, less than five trays may be present in the MPB. This is because only three trays can be actively used for pick and place operations while any other tray would be idle on one of the BDS indexing conveyors. For analysis purposes, it will be assumed that five munitions trays will be present and that each tray is completely filled with agent-filled munitions. This is equivalent to one of the following:

14.5.7.3.2.1 240 155mm projectiles (48 per tray)
14.5.7.3.2.2 480 105mm projectiles (96 per tray)
14.5.7.3.2.3 480 mortar-cartridges (96 per tray).

14.5.7.3.3 Assuming, for example, each munition is completely filled, the maximum inventory of agent in the MPB during MDM operations is 264 gallons (this corresponds to 240 munitions times a maximum of 11.7 pounds of H per munition). In the event all the agent spills onto the floor of the MPB, the sumps will be able to hold all the spilled liquid.

14.5.7.3.4 In addition to the sumps, the MPB contains curbed walls so that liquid spills and decontamination solution will not leak under doors and gates. The floors and walls are painted with epoxy chemical-agent resistant paints to aid in decontamination.

14.5.7.4 <u>Site Air Conditions</u>

14.5.7.4.1 See Section 14.2.7.4.

14.5.7.5 Topography

14.5.7.5.1 See paragraph14.2.7.5.

14.5.7.6 Meteorologic and Atmospheric Conditions

14.5.7.6.1 See paragraph 14.2.7.6.

14.5.7.7 Air Quality

14.5.7.7.1 See Section 14.2.7.7.

14.5.7.8 Prevention of Air Emissions

14.5.7.8.1 See Section 14.2.7.8.

14.5.7.9 Operating Standards

14.5.7.9.1 The MPB is a Category A area and is under engineering controls at all times, as previously discussed. Liquid wastes are captured and controlled in the containment system, air emissions are controlled by the HVAC system and cleaned through filters, and the MDM operations are continuously monitored by the CON and PDARS. As a result, there is virtually no opportunity for the waste constituents to be released in such a way as to have adverse effects on human health or the environment due to migration into the outdoor environment. The liquids are placed in tanks or, if spilled, are contained in sumps and from there placed in tanks. Volatilized agent is captured by the HVAC system, primarily in carbon beds. The MDMs themselves are operated in a systematic and safe manner whether in automatic or manual mode, thereby reducing the potential for agent to be released and migrate into the air.

14.5.7.10 Site Hydrologic Conditions

14.5.7.10.1 See Section 14.2.7.10.

14.5.7.11 Migration of Waste Constituents

14.5.7.11.1 See Section 14.2.7.11.

14.6 MINE MACHINE

14.6.1 Physical Characteristics

14.6.1.1 The mine handling system, of which the Mine Machine is a part, is designed to prepare VX mines for demilitarization. The mine handling system transports the mines through the ECV to ECR B where the chemical agent from the mine is drained and the mine is then processed through the Deactivation Furnace System (DFS). The chemical agent drained from the mine is collected by the Agent Collection System (ACS), a separate system that includes the Agent Quantification System (AQS) and the agent holding tanks, as well as associated pumps, valves, piping, and other ancillary equipment. It is then incinerated in the Liquid Incinerators (LICs).

14.6.1.2 The mine handling system consists of one process line (Line B) located on the second floor of the MDB. The line consists of conveyors and a Mine Machine.

14.6.1.3 The Rocket/Mine Input Conveyor No. 2 is located in the ECV; it separates the UPA from the ECR. The Mine Machine, which actually punches and drains the mine, is located in ECR B.

14.6.1.4 The mine input conveyors and airlock are not considered part of the Mine Machine but are part of the material handling equipment system.

14.6.1.5 Support Equipment/Structures

14.6.1.5.1 The mines are transferred from the ECV into ECR B through the ECR blast gate MMS-GATE-102. This gate opens to receive a mine or a Mine Component Container (MCC) and will not close until the mine or MCC is transferred completely into the ECR. The MCCs are cardboard containers, shaped like mines, which are used to transfer fuzes and activators through the Mine Machine and to the DFS.

14.6.1.5.2 The Mine Machine is equipped with a pump (ACS-PUMP-108) to remove chemical agent from the mines. The drained chemical agent is transferred from the Mine Machine through lines connecting the pumps to the AQS and ACS.

14.6.1.5.3 To provide effective containment in the event of any spills, leaks, or explosions, the ECR has been equipped with blast doors and blast gates that remain closed while draining operations are taking place. Furthermore, the ECR is provided with a containment sump, and the air from the room is cycled through a ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, the ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene (TNT). Although each mine contains approximately one pound $TNT_{Equivalent}$ of explosives, an MCC contains less since the fuzes and activators weigh much less than the M38 burster that is part of the mine. To ensure that this design limit is not exceeded, no more than twelve items (either mines or MCCs or a combination of the two) are allowed inside the ECR at any given time.

14.6.1.6 Instrumentation

14.6.1.6.1 The Mine Machine is operated by PLCs. The PLCs interface with the controls and instruments for the Mine Machine.

14.6.1.6.2 There are a variety of sensors installed to support the operation of the Mine Machine. The sensors are used to track process flow through the machine and to continually update the PLC with new information. These sensors are listed in Table 14-6-1[7] by tag number, sensor type, and a brief functional description.

14.6.1.7 Utilities

[7] All tables are located at the end of this section.

14.6.1.7.1 The electrical system, HVAC system, fire protection system, and alarm and communication systems for the MDB and ECR B are discussed in Sections 14.2.1.16 through 14.2.1.19.

14.6.2 Operations and Maintenance

14.6.2.1 System Operation

14.6.2.1.1 Mines will be delivered to the UPA in ONCs. Each ONC may contain up to twelve mine drums. Each mine drum may contain a maximum of three mines, three fuzes, and three activators. The fuzes and activators are not part of the mine assembly and are packed within different compartments within the mine drum. The ONCs will be monitored as specified elsewhere in the Permit and unpacked. Any sealed[8] ONCs determined to have agent levels greater than 40 TWA will be unpacked in the TMA. However, during routine operations, the mine drums will be unloaded from the ONCs in the UPA and either placed on the bypass conveyor and transferred into the ECV for unpacking or stored on secondary containment pallets in the UPA. Prior to transferring the mine drums into the ECV, the vapor space of each mine drum may be monitored for the presence of agent using a Mine Drum Monitoring Device (MDMD). Any drums identified to contain agent vapor will be conservatively processed as containing “known leakers” and the MDMD will remain on the drum throughout the drum’s MPF processing.

14.6.2.1.2 Mine drums with known leakers are transferred to the ECR for unpacking by personnel wearing the appropriate level of PPE. The same is true for any leakers identified during routine processing in the ECV. If a leaker is found during routine processing in the ECV, the mines, fuzes, activators, packing material, and, as necessary, contaminated PPE (e.g., gloves) will be placed back into the drum in question and the drum will be transferred into the ECR for unpacking. The mines, fuzes, and activators will be processed as described below except a table/cart may not be used and the ECV conveyor operations will be bypassed. Agent-contaminated drum lids, rings, and drums will either be bagged/containerized and placed into storage, processed through the MPF, or both. Agent-contaminated packing (e.g., styrofoam cushioning material) from mine drums that contained leaking mines will be bagged/containerized and placed into storage until a treatment method is approved by the Executive Secretary.

14.6.2.1.3 During routine processing in the ECV, three mines, three fuzes, three activators, and packing material are removed from each drum. Operators may use grippers connected to a jib crane to remove the mines from the drums. The mine drums may be inclined towards the operator to facilitate the removal of the drum contents. Likewise, magnets may be used to facilitate removal of activators and fuzes. As the mines and various components are removed from a drum, they may be placed on a utility cart or unloading table to aid in segregation and transport. The fuzes and activators are loaded into the MCCs. The cart or table containing the mines and MCCs will be rolled from the area adjacent to the bypass conveyor to the area adjacent to the Rocket/Mine Input Conveyor No. 2 (MMS-CNVM-104). Alternatively, operators may use a roller conveyor to transfer mines and MCCs from the bypass conveyor to Rocket/Mine Input Conveyor No. 2.

[8] The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

14.6.2.1.4 Mines and MCCs are then placed onto Rocket/Mine Input Conveyor No. 2 located in the ECV. This conveyor uses a metering system to transport mines and MCCs through blast gates into ECR B and onto the Mine Machine Feed Conveyor. This conveyor uses a second metering system to meter mines and MCCs to the Mine Machine (MHS-MIN-101). A MCC verification cylinder verifies the type of item, mine or MCC, before the second metering system allows transport to the Orientation Station of the Mine Machine.

14.6.2.1.5 If the item is determined to be an MCC, the yoke rotary actuator will rotate approximately 180 degrees placing the MCC onto the trolley for subsequent feed to the DFS, bypassing the punch and drain operation.

14.6.2.1.6 If the item is a mine, it moves into the yoke of the orientation station. The mine is rotated about 90 degrees to a vertical position and clamped in place. The mine is punched and agent is drained to the Agent Quantification System (AQS) and then to the ACS tanks. The amount of agent that will be drained from each mine is equal to or greater than 95% of the nominal fill. In the event that the AQS fails to remove 95% of the agent from a mine, an alarm will sound, the CON advisor screen will indicate an insufficient drain condition, and the operators will follow the requirements specified in Module VIII of the Permit (ref: Condition VIII.E.15).

14.6.2.1.7 After the mine has been punched and drained, it is rotated further about 90 degrees to the horizontal position and placed upside down on the trolley. The trolley moves the mine into position in the Fuze Well Assembly Removal Station (FARS). (Note: the MCCs pass unchanged through the FARS). The fuze well assembly is unscrewed from the bottom of the mine. The trolley then pushes the mine and fuze well assembly onto the DFS feed chute gate.

14.6.2.1.8 The mine body, mine components, activators, fuzes and MCCs are all processed in the DFS. Agent contaminated mine drums, lids, rings, and packing material will be managed as described above. Uncontaminated mine drums, lids, rings, and packing material will be managed in accordance with criteria specified in Attachment 2 (Waste Analysis Plan).

14.6.2.2 <u>Interlock Process</u>

14.6.2.2.1 The Mine Machine is operated in either the manual or automatic mode using a system of interlocks. One goal of the various interlocks is to ensure that the procedures executed by the various components of the Mine Machine do not interfere with each other. Another goal is to ensure that the Mine Machine operates in a manner that is safe to human health and protective of the environment. The critical interlocks are identified in Table 14-6-1. In addition, the interlocks remain in place during manual operation. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.6.2.3 <u>System Shutdown (Normal)</u>

14.6.2.3.1 Normal shutdown of the Mine Machine is done in accordance with standard operating procedures. The system must first be clear of all munitions. The CON operators then issue “stop” and “park” commands to the system. The equipment is placed in home position at this time.

14.6.2.4 Emergency Shutdown

14.6.2.4.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition may include any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.6.2.5 Extended Shutdown

14.6.2.5.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the Mine Machine systems have been parked. Some of the extended shutdown procedures are implemented during campaign changeover.

14.6.2.6 Maintenance

14.6.2.6.1 To ensure that the Mine Machine is in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the Mine Machine will be systematically subjected to preventative maintenance inspections.

14.6.3 Inspection

14.6.3.1 See Section 14.2.4.

14.6.4 Closure

14.6.4.1 Partial Closure

14.6.4.1.1 See Section 14.2.5.1.

14.6.4.2 Final Closure

14.6.4.2.1 See Section 14.2.5.2.

14.6.5 Mitigative Design and Operating Standards

14.6.5.1 The mitigative design features and operating standards for ECR B are described in Section 14.2.6.

14.6.6 Environmental Performance Standards for Miscellaneous Units

14.6.6.1 The Mine Machine has been designed and will be installed and operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.2.7 describes the potential for waste constituent releases to the environment (air, soil, and water) for the RSM. The potential releases associated with the RSM are greater than the potential releases associated with the Mine Machine since the RSM includes a shearing operation that releases more agent into the ECR.

14.6.6.2 The potential impact of such releases, and the location and engineering control features of the TOCDF that will mitigate these releases are described in Section 14.2.7 and are applicable to the Mine Machine operation as well as the RSM.

14.6.6.3 Miscellaneous Unit Wastes

14.6.6.3.1 The volume and the physical and chemical characteristics of the wastes to be treated at the Mine Machine include M23 mines and their components. These wastes have been identified and information about their physical and chemical characteristics may be found in this Permit, Attachment 2 (Waste Analysis Plan).

14.6.6.3.2 All components of a mine, including its fuzes and activators are to be incinerated in the DFS (except for the drained chemical agent, which is pumped to the ACS and incinerated in the LICs).

14.6.6.4 Containment System

14.6.6.4.1 The Mine Machine is located in ECR B in the MDB. The containment system for ECR B is further described in the TOCDF RCRA Permit, Table 4. ECR B contains curbs, walls, ceiling, and a sump. The floor is coated with an agent-resistant coating and sloped toward a sump. The walls, curbs, and ceiling are also coated with agent-resistant coating. The sump located in ECR B is a primary containment sump. It has a trench and dimensions of approximately 2.75 by 2.75 by 2.38 feet, with a capacity of about 89 gallons. The volume of the sump is more that sufficient to contain any chemical agent spill in the ECR.

14.6.6.4.2 The sump is constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The external liner for the sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The concrete is designed to be free from cracks or gaps.

14.6.6.4.3 The sump metal internal liner is equipped with a level sensor probe to detect liquid. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner will be sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for detection within 24 hours of occurrence.

14.6.6.4.4 ECR B is inside the MDB and is thus protected from climatic conditions and precipitation so no overflow of the containment system due to run-on will occur.

14.6.6.5 Site Air Conditions

14.6.6.5.1 See Section 14.2.7.4.

14.6.6.6 Topography

14.6.6.6.1 See Section 14.2.7.5.

14.6.6.7 Meteorologic and Atmospheric Conditions

14.6.6.7.1 See Section 14.2.7.6.

14.6.6.8 Air Quality

14.6.6.8.1 See Section 14.2.7.7.

14.6.6.9 Prevention of Air Emissions

14.6.6.9.1 See Section 14.2.7.8.

14.6.6.10 Operating Standards

14.6.6.10.1 Based on the above, agent is assumed to be the pollutant of concern from the Mine Machine with respect to air emissions.

14.6.6.10.2 Agent emissions from the Mine Machine will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to a 120-foot stack.

14.6.6.10.3 The Mine Machine is located in ECRB within the MDB. The ECR is maintained at a pressure of approximately -2.0 inches of water column. This room is maintained at the lowest pressures within the MDB so all air emissions from the Mine Machine during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.6.6.10.4 Attachment 5 (Inspection Plan) of this Permit covers the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, some operation procedures have been implemented to minimize the potential for air emissions while operating the Mine Machine:

14.6.6.10.4.1 Munitions will be drained of agent as soon as they are punched, thus reducing the likelihood of evaporation (agent will be collected by the ACS and contained in AQS tanks near the Mine Machine).

14.6.6.10.4.2 Sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect agent, and to determine loss of blower performance.

14.6.6.11 Site Hydrologic Conditions

14.6.6.11.1 See Section 14.2.7.10.

14.6.6.12 Migration of Waste Constituents

14.6.6.12.1 See Section 14.2.7.11.

14.7 AIR OPERATED REMOTE ORDNANCE ACCESS SYSTEM (CUTTER MACHINE)

14.7.1 Physical Characteristics

14.7.1.1. The cutter machine is designed to remotely cut into cylindrical items. It may be used for nose closure removal, fuze removal, venting, and access to material or interior components. The machine is primarily made of aluminum and is a commercially available radial pipe cutting machine that has been modified for use in toxic areas. The major components of the system are a stabilizing base, split frame Wachs® cutter, cutter base and stabilizing legs, air motor and speed controller, vent hose, air lubrication mister, mister tube and stand, pyrometer and stand, and an air isolation valve. The split frame major components are: a tool slide, cutter blade, trip assembly, and star wheel. The split frame portion of the cutter is a pre-fabricated stand which has four bolts on the cutter frame. These bolts determine the level of the cut on the item by adjusting the height of the item and positioning it for the cutter.

14.7.1.2. Equipment Installation

14.7.1.2.1. The equipment that constitutes the cutter machine is not a permanently installed item. The cutter machine is intended to be used for the duration of the specialized campaign and then managed in accordance with paragraph 14.7.4, Closure. A cutter machine may be set up in the ECR for explosive or non-explosive configured items, or in the MPB for non-explosive configured items only. In the event of an equipment failure beyond repair, a new cutter machine will be set up as a replacement-in-kind.

14.7.1.3 Dimensions and Location

14.7.1.3.1. The approximate size of the cutter machine is 14 inches in diameter, and 24 inches in height. Machine components are aluminum and steel. Some of the machine components are nickel plated. Dead weight of the cutter machine and split frame cutter is estimated at 60 lbs.

14.7.1.4. Conveyors

14.7.1.4.1. The are no conveyors associated with the Cutter Machine. Items to be processed by the cutter machine are manually placed upon the pre-fabricated stand to position the item.

14.7.1.5 Gates

14.7.1.5.1. Items that are configured with energetics or non-energetics may be transferred either automatically or by remote manual control from the ECV into the ECRs through one of two ECR blast gates. These gates open to receive an item and will not close until the item is transferred completely into the ECR. For non-energetic items to be processed in the MPB, trays are transferred automatically from the Munitions Corridor into the MPB through one of two MPB gates. The gates are opened to receive items and they will not close until the items are transferred completely into the MPB.

14.7.1.6. Pumps and Transfer Lines

14.7.1.6.1. There are no pumps or transfer lines directly associated with the cutter machine.

14.7.1.7. Sump Pump

14.7.1.7.1. Both the ECRs and the MPB are equipped with containment sumps. Sump pump operation is controlled by a local-off-remote switch. When a sump level alarm is sent to the CON, the liquids collected in the sump are pumped to a spent decontamination holding tank.

14.7.1.8. Tanks and Containers

14.7.1.8.1. There are no tanks or containers directly associated with the cutter machine. Agent from the items processed by the cutter machine is either pumped to the ACS or SDS (after initial decontamination at the point of removal) or may be placed in the sumps for further processing.

14.7.1.9. Feed System

14.7.1.9.1. Items to be processed using the cutter machine will be manually placed on the cutter by personnel clad in the appropriate level of PPE based upon the hazards of the operation. All items will be manually processed in accordance with site approved operating procedures.

14.7.1.10. Instrumentation

14.7.1.10.1. There is no permanent PLC interface with the controls and instruments for the cutter machine. Any PLC interfaces that are added will be installed via the Temporary Change Process with all site required signatures and appropriate site reviews. The cutter machine operation is controlled remotely from the CON with careful monitoring via closed-circuit television.

14.7.1.11. Electrical System

14.7.1.11.1. See Section 14.2.1.16.

14.7.1.12. Heating, Ventilation, and Air Conditioning System (HVAC)

14.7.1.12.1 See Section 14.2.1.17.

14.7.1.13. Fire Protection System

14.7.1.13.1. See Section 14.2.1.18.1. and paragraph 14.3.1.14.

14.7.1.14. Alarm and Communications Systems

14.7.1.14.1. See Section 14.2.1.19.1. and paragraph 14.3.1.15.

14.7.2. Operations and Maintenance

14.7.2.1. The cutter machine will be utilized inside the Explosives Containment Rooms or in the Munitions Processing Bay to gain access to munitions or cylindrical items that require special handling. It may be used for nose closure removal, fuze removal, venting, and/or access to interior components. The cutter machine will be used in accordance with site approved operating procedures.

14.7.2.2. General System Operation

14.7.2.2.1. The cutter machine will be located in either ECR A, ECR B, or in the Munitions Processing Bay. The cutter is comprised of two components, the cutter and the split frame which correctly positions the item for the cutter. The cutter machine is a commercially available radial type pipe cutter designed to cut cylindrical items. The cutter is comprised primarily of aluminum components. It has been modified with an air isolation valve and mister tube. After the munition or cylindrical item is placed on the stabilizing base and appropriately prepared for cutting operations, the Control Room remotely activates supplied air to the cutter. The spray mister will begin to function and the cutting speed may be adjusted by the entrants. The mister nozzle tip will spray on the cut path in order to ensure that cutting temperatures remain near ambient. The cut is lubricated by an air mist of water based lubricant. The control room then monitors the cutter operation through the use of CCTV and process indicators in the Control Room. In the case of explosive configured items, while the cutting operations are in progress, entrants will exit the ECR.

14.7.2.3. System Startup

14.7.2.3.1. The procedure for the cutter machine start-up is contained in the appropriate Unusual Munition Handling SOP and related documents. In summary, the machine will be set-up by site personnel who will verify that the equipment is configured properly prior to use.

14.7.2.4. Feed

14.7.2.4.1. The munitions or cylindrical items will be placed upon the cutter machine one at a time for handling. Careful coordination of the operation will occur between the entrants and the Control Room personnel in accordance with site approved standard operating procedures.

14.7.2.5. Interlocks

14.7.2.5.1. Emergency shutoff of the cutter machine is via an air isolation valve. All emergency shutoff valves will be referenced in the appropriate SOPs of the operation.

14.7.2.6. System Shutdown (Normal)

14.7.2.6.1. The cutter machine operation is controlled remotely from the CON. To stop the cutter machine, the air solenoid is closed from the Control Room.

14.7.2.7. Emergency Shutdown

14.7.2.7.1. The Emergency Shutdown process is controlled remotely from the CON. The air solenoid will be shutdown from the CON, causing the cutter machine to stop. All activities are closely monitored by the CON via the CCTV.

14.7.2.8. Maintenance

14.7.2.8.1. The cutter machine is set up for a short-duration use to handle unusually configured munitions or cylindrical items. Since the duration of it's operation is very short, no maintenance plan is required.

14.7.2.9. Monitoring Procedures

14.7.2.9.1. The CON operators monitor the operations of the cutter machine through the use of the CCTVs. In addition, CON operators are required to log the events that occur during their shift into logbooks and the appropriate munitions waste tracking forms.

14.7.2.10. Waste Identification

14.7.2.10.1 By the time a munition or cylindrical item reaches the cutter machine, it will have been fully identified in accordance with Attachment 2 (Waste Analysis Plan).

14.7.2.11. Waste Throughput

14.7.2.11.1 The cutter machine is, by design, used to gain access to the interior portions of a munition or a cylindrical item, to facilitate the appropriate treatment of the waste by allowing munitions or other items to be managed through the other approved treatment processed for agent, overpack material, or metal munition bodies or cylinders. Munitions are manually placed in the cutter by site personnel dressed in the appropriate level of PPE. Any liquid agent that is present during the cutting process is decontaminated with decontamination solution. The spent decontamination solution is collected in the sump and pumped to the SDS tank for eventual thermal treatment in the LIC. Any liquid collected in the sumps is emptied at least daily.

14.7.3. Inspection

14.7.3.1. The cutter machine will be inspected prior to first use after it has been assembled. Since the duration of the cutter machine operation is expected to be short, no permanent inspection plan is in place. The cutter machine is intended to be set-up, used for a short duration that is campaign specific, and dismantled when no longer needed.

14.7.4. Closure

14.7.4.1. Partial Closure

14.7.4.1.1. At the conclusion of the agent campaign, the cutter machine will be thoroughly decontaminated. The equipment may be re-used or scrapped and managed as waste. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the cutter.

14.7.4.2. Final Closure

14.7.4.2.1. Final closure of this site is addressed in Attachment 10 (Closure Plan).

14.7.5. Mitigative Design and Operating Standards

14.7.5.1. For the Mitigative Design and Operating Standards for the ECRs, refer to paragraphs 14.2.6.1. through 14.2.6.6. For the Mitigative Design and Operating Standards in the MPB, refer to paragraphs 14.3.6.2. and 14.3.6.3.

14.7.5.2. The cutter machine will be operated in a manner to preclude the release of hazardous chemical constituents that may have an adverse effect on human health and the environment. The following section describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impacts of such releases, and the location features of the TOCDF that will mitigate these releases.

14.7.5.3. Environmental Performance Standards for Miscellaneous Units

14.7.5.3.1. The cutter machine can be installed in either of the ECRs, or in the Munitions Processing Bay for non-explosive configured items. The ECRs and the Munitions Processing Bay have been designed, installed, and operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health and the environment. Section 14.2.7.2 describes the potential for waste constituents releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.7.5.4. Miscellaneous Unit Wastes

14.7.5.4.1. The volume and the physical and chemical characteristics of the wastes to be treated at the cutter machine include munitions or other cylindrical items. These wastes will be fully identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan) or characterized in accordance with Attachment 2 (Waste Analysis Plan). The maximum volume of these wastes that can be processed in the cutter machine at one time is equivalent to the number of munitions that can be processed by the cutter, which is one. All metal components will be incinerated in the DFS or MPF. Energetic components may be fed to the DFS unsheared in accordance with site approved operating procedures. All drained chemical agent will be pumped to the ACS or the SDS (after initial decontamination at the point of removal) for incineration in the LICs.

14.7.5.5 Containment System

14.7.5.5.1. See Paragraphs 14.2.7.3.1. through 14.2.7.3.4.

14.7.5.6. Site Air Conditions

14.7.5.6.1. See Paragraph 14.2.7.4.1.

14.7.5.7. Topography

14.7.5.7.1. See Paragraph 14.2.7.5.1.

14.7.5.8. Meteorological and Atmospheric Conditions

14.7.5.8.1. See Paragraph 14.2.7.6.1.

14.7.5.9. Air Quality

14.7.5.9.1. See Paragraphs 14.2.7.7.1. through 14.2.7.7.3.

14.7.5.10. Prevention of Air Emissions

14.7.5.10.1. The cutter machine itself is not a source of air emission in and of itself, but it is associated with treatment operations that could potentially emit air pollutants. See Paragraphs 14.2.7.8.1. through 14.2.7.8.5.

14.7.5.11. Operating Standards

14.7.5.11.1. The cutter machine is a commercially available radial pipe cutter. It will be operated in accordance with manufacturer's guidelines and site approved operating procedures.

14.7.5.12. Site Hydrologic Conditions

14.7.5.12.1. A summary of site hydrologic conditions is given in Attachment 1 (Facility Description). For additional description, see Paragraph 14.2.7.10.2.

14.7.5.13. Migration of Waste Constituents

14.7.5.31.1. Migration of wastes into the environment from the cutter machine is not expected to occur. The cutter machine will be operated in the MDB, which is designed to prevent the migration of waste to the environment. Therefore, no impacts on human health and the environment from the cutter machine are expected.

Table 14-2-1
ROCKET SHEAR MACHINE SENSOR FUNCTIONS

Sensor Number	Type of Sensor	Functional Description
PLS-1	Inductive Proximity Switch	Rotary Actuator is sensed at the fully retracted or "home" position.
PLS-2	Inductive Proximity Switch	Rotary Actuator is sensed at the fully extended position.
PLS-3*	Opposed-Beam Photo-Electric (Fiber Optic) Sensor	Indicates rocket presence at the punch and drain position. The switch is located directly in front of the positive stop.
PLS-4*	Inductive Proximity Sensor	Indicates that the pusher index assembly is at the home position. This information is also used to reset the pusher position optical encoder.
RSM-ENC-1*		Rocket Shear System Pusher Index Assembly Optical Encoder
PLS-5A&B*	Opposed-Beam Photo-Electric Sensor	Indicates that the rocket is fully forward against the index stops. The switch sensors are located at about the halfway point on the transport conveyor.
PLS-6*	Opposed-Beam Photo-Electric Sensor	Detects rocket presence and actuates index stops to extend. The switch sensors are located at the end of the rocket trough, just beyond the index stops.
PLS-7* PLS-8* PLS-9*	Inductive Proximity Sensor	All three switches (PLS-7, 8, and 9) are installed and used only during Burster Size Reduction operations. Each switch indicates that the burster is present in that particular zone of the burster chute. The system requires that the burster must make two of three switches before they are indexed forward to the shear station.
* Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.		

Table 14-3-1
LIST OF BULK DRAIN STATION SENSORS AND CRITICAL INTERLOCKS

Sensor Tag	Sensor Type	Functional Description
49-1-P1 (Line A)[a] 49-2-P1 (Line B)[a]	Retroreflector Beam Sensor	Indicates the tray is on the BDS Transfer Conveyor, shifts Transfer Conveyor to slow speed (Start of BDS).
49-1-P2 (Line A)* 49-2-P2 (Line B)*	Inductive Proximity Sensor	Indicates the cradle is at the punch position.[b]
49-1-P3 (Line A)* 49-2-P3 (Line B)*	Inductive Proximity Sensor	Indicates the cradle is at the drain position.
49-1-P4 (Line A)* 49-2-P4 (Line B)*	Inductive Proximity Sensor	Indicates the cradle (ton containers) is in the vent punch position.
49-1-P5 (Line A) 49-2-P5 (Line B)	Retroreflector Beam Sensor	Indicates the tray is transferring to the next Hydraulic Conveyor.
102A1-102A4*	Inductive Proximity Sensors	Indicate the Transfer Conveyor Lift Cylinders are extended.
102B1-102B4	Inductive Proximity Sensors	Indicate the Transfer Conveyor Lift Cylinders are retracted.
103A	Inductive Proximity Sensor	Indicates the Punch Cylinder is extended.
103B	Inductive Proximity Sensor	Indicates the Punch Cylinder is retracted.
104A*	Inductive Proximity Sensor	Indicates the Drain Tube is fully extended.
104B*	Inductive Proximity Sensor	Indicates the Drain Tube is fully retracted.
104C	Inductive Proximity Sensor	Indicates the Drain Tube is in Mid-Position 1.
104D	Inductive Proximity Sensor	Indicates the Drain Tube is in Mid-Position 2.
106A1-A2	Inductive Proximity Sensor	Indicates the Hold Down Cylinders are extended.
106B1-B2	Inductive Proximity Sensor	Indicates the Hold Down Cylinders are retracted.
9104A**	Inductive Proximity Sensor	Indicates the Level Probe is fully extended.
9104B	Inductive Proximity Sensor	Indicates the Level Probe is fully retracted.
49-LIT-9001**	Level Sensor	Indicates whether or not the remaining agent heel in ton containers is less than 5% of the nominal fill amount.

Notes:
[a] Sensor can be used to monitor throughput of munitions/bulk items.
[b] Interlocks MDM-GATE-101 and -102
* Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.
** Critical Sensor or Interlock that should be functional when the associated miscellaneous unit is operating. If this Critical Sensor or Interlock is not functional, the drain status of ton containers must be verified by personnel making an entry into the MPB.
BDS = Bulk Drain Station

Table 14-4-1
MAXIMUM EXPLOSIVE WEIGHT IN EXPLOSIVE CONTAINMENT ROOM

	Normal Process Mode		**Reject Process Mode**	
Munitions (Explosive Type)	No. of Rounds/Burster In ECR	Explosive Weight In ECR (TNT_{Eq})	No. of Rounds/Burster in ECR	Explosive Weight In ECR (TNT_{Eq})
105mm/M360 (Comp B)	4	6.12	4	6.12
155mm/M110 (Tetrytol)	4	1.92	4	1.92
155mm/M121 (Comp B)	4	14.12	4	14.12
155mm/M121A1 (Comp B-4)	4	14.12	4	14.12
4.2-in./M2A1 (Tetrytol)	2	0.42	4	0.84

Note:

ECR = Explosive Containment Room

1. Based upon ECR design (ref: Section 14.4.1.4.2), the maximum quantity of explosive material allowed in an ECR is 15 lbs (trinitrotoluene equivalent (TNT_{Eq})). Therefore, in addition to the quantities identified above, the TOCDF may have other explosive materials in the ECR provided that the total quantity in the ECR does not exceed 15 lbs (TNT equivalent). TNT Equivalence is based on the specific explosive type's brisance as compared to TNT as reported in Army Technical Manual TM 9-1300-214.

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
P-1*	Inductive Proximity Sensor, 10mm range	Indicates the munition is in the Transfer Station.
102B	Inductive Proximity Sensor, 10mm range	Indicates the Transfer Conveyor Trolley is in its home position.
103A	Inductive Proximity Sensor, 5mm range	Indicates the saddle is in the load position.
103B	Inductive Proximity Sensor, 5mm range	Indicates the saddle is in the unload position.
103C	Inductive Proximity Sensor, 10mm range	Indicates the Index Table is indexed at proper position to line up with each other.
110A/B*	NAMCO Switch	Senses when the burster probe is extended or retracted.
P-2*	Inductive Proximity Sensor, 35mm range	Indicates the munition is in correct position to begin operation at the NCRS.
P-21*	Fiber Optic Sensor	Indicates the fuze/nose closure is in the Chuck Jaws when the NCR carriage is fully retracted.
P-22	Fiber Optic Sensor	Indicates the M557 fuze is in the punch position (M360). Also indicates the burster is in position for unscrewing fuzes from bursters (M2A1).
201B*	Inductive Proximity Sensor, 5mm range	Indicates the Projectile Clamp Cylinder is extended and munition is clamped.
201C	Inductive Proximity Sensor, 5mm range	Indicates the Projectile Clamp Cylinder is retracted and the munition is unclamped.
202A	Inductive Proximity Sensor	Indicates the NCR Carriage is fully extended.
202B	Inductive Proximity Sensor	Indicates the NCR Carriage is fully retracted.
202C	Inductive Proximity Sensor, 5mm range	Indicates the NCR Carriage is in the mid-position.
PS-203A	Pressure Switch	Indicates the Hydraulic Chuck Jaws are fully extended or clamped on a nose closure/fuze.
PS-203B	Pressure Switch	Indicates the Hydraulic Chuck Jaws are fully retracted.
PS-204A*	Pressure Switch	Indicates the Chuck Motor (spindle) has stalled.
204C	Inductive Proximity Sensor, 5mm range	Indicates the number of revolutions that the Hydraulic Chuck turns.
206A	Inductive Proximity Sensor	Indicates the Gripper Slide Cylinder is fully extended and the Gripper Slide Assembly is in the "up" position.
206B	Inductive Proximity Sensor	Indicates the Gripper Slide Cylinder is fully retracted and the Gripper Slide Assembly is in the down position.
207A	Inductive Proximity Sensor	Indicates the Booster/Burster Gripper Cylinder is fully extended, jaws "open."
P-3*	Inductive Proximity Sensor, 10mm range	Indicates the projectile is in position at the MPRS.
P-31*	Fiber Optic Sensor	Indicates the fuze well cups and supports are removed at the MPRS.
301A	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully extended and the V-plate is raised.
301B	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully retracted and the V-plate is "down."
302A	Inductive Proximity Sensor	Indicates the Projectile Hold Down Cylinder is extended.
302B	Inductive Proximity Sensor	Indicates the Projectile Hold Down Cylinder is retracted.
303A	Inductive Proximity Sensor	Indicates the MPR Carriage Cylinder is extended and carriage is in "home" position.

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
303B	Inductive Proximity Sensor	Indicates the MPR Carriage Cylinder is retracted and carriage is in fully "forward" position.
303C	Inductive Proximity Sensor, 5mm range	Indicates the MPR Carriage is in mid-position.
303D	Inductive Proximity Sensor, 5mm range	Indicates the MPR Carriage is in position to begin bakelite fuze well cup cutting sequence (for M110 projectiles only).
304A	Inductive Proximity Sensor	Indicates the Fuze Well Cup Collet Release Cylinder is extended to release Collet.
304B	Inductive Proximity Sensor	Indicates the Fuze Well Cup Collet Release Cylinder is retracted to set the Collet.
308A	Inductive Proximity Sensor, 5mm range	Indicates the Air-Probe Cylinder is extended (M121A1 only).
308B	Inductive Proximity Sensor, 5mm range	Indicates the Air-Probe Cylinder is retracted (M121A1 only).
P-4*	Inductive Proximity Sensor, 35mm range	Indicates a projectile is in correct position at the BRS.
401A	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully extended and the V-plate is "raised."
401B	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully retracted and the V-plate is "down."
402A	Inductive Proximity Sensor, 5mm range	Indicates the BRS Carriage is fully extended (forward).
402B	Inductive Proximity Sensor, 5mm range	Indicates the BRS Carriage is in the retracted position.
402C	Inductive Proximity Sensor, 10mm range	Indicates the BRS Carriage has retracted to the mid-position to allow the burster to be gripped by the Burster Gripper.
403A*	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder is fully extended.
403B*	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder has fully retracted to the "failed to Extract Burster" position.
403C	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder head has retracted part way to the "Air Off" position and extended part way to the "Collet Released" position.
404A	Inductive Proximity Sensor	Indicates the Burster Conveyor Lift Cylinder is fully extended and the Burster Conveyor is in the "lowered" position.
404B	Inductive Proximity Sensor	Indicates the Burster Conveyor Lift Cylinder is fully retracted and the Burster Conveyor is in the "raised" position.
405A	Inductive Proximity Sensor	Indicates the Burster Gripper Cylinder is extended and jaws are "closed."
405B	Inductive Proximity Sensor	Indicates the Burster Gripper Cylinder is retracted and jaws are "open."
406A	Inductive Proximity Sensor, 10mm range	Indicates the Burster Gripper Assembly is in position over the burster.
406B	Inductive Proximity Sensor, 10mm range	Indicates the Burster Gripper Assembly is in its "Home" position over the BSR chute.
PMD-ENC-1*		Transfer Conveyor Optical Encoder (20904)
300V1	2-way solenoid valve, normally closed	Used to provide 100 psi compressed air to the MPRS Air Blast Tube.
300V2	2-way solenoid valve, normally	Used to provide 300 psi compressed air to the MPRS Air

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
	closed	Blast Tube.
308VA	4-way, two position, solenoid valve	Used to provide 100 psi compressed air to extend and retract the MPRS Air-Probe (M121A1).
400V1	2-way solenoid valve, normally closed	Used to provide 100 psi compressed air to the BRS Delta-P Head Assembly (and 300 psi compressed air in when operated with 400V3).
400V2	2-way solenoid valve, normally closed	Used to vent 100 psi or 300 psi compressed air from the Delta-P Head Assembly.
400V3	2-way solenoid valve, normally closed	Used to provide 300 psi compressed air to the BRS Delta-P Head Assembly.

Notes:
BRS = Burster Removal System
MPR = Miscellaneous Parts Removal
MPRS = Miscellaneous Parts Removal Station
NCR = Nose Closure Removal
NCRS = Nose Closure Removal System
PLC = Programmable Logic Controller
Psi = Pounds per Square Inch
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS

Sensor Tag[a]	Sensor Type	Location of Sensor	Functional Description
45-1-100C	Proximity Detector Stations	Index Table	Indicates the Index Table is properly aligned with MDM.
45-1-101A/B	NAMCO Switch	Index Table	Senses when projectile slide cylinder #1 is extended/retracted.
45-1-101C*	Proximity Detector	Station 1	Senses when a munition is at the LUS.
45-1-101D*	Fiber Optic Sensor	Station 1	Senses the presence of a crimped burster well at the LUS during the reinsert mode.
45-1-401A/B	NAMCO Switch	Station 4	Senses when projectile slide cylinder #4 is extended/retracted.
45-1-402A/B	NAMCO Switch	Station 4	Senses when the projectile clamp cylinder is extended/ retracted.
45-1-402C	Pressure Switch	Station 4	Senses when the projectile clamps are clamped.
45-1-403A/B	NAMCO Switch	Station 4	Senses when the boring head feed cylinder is fully extended/retracted.
45-1-404A/B*	NAMCO Switch	Station 4	Senses when the burster probe is extended or retracted.
45-1-406A/B	NAMCO Switch	Station 4	Senses when the plug transition chute is extended/retracted.
45-1-407	Vaccon Vacuum Switch	Station 4	Verifies that a plug is present in the socket assembly.
45-1-501A/B	NAMCO Switch	Station 5	Senses when the projectile slide cylinder #5 is extended/retracted.
45-1-502A/B	NAMCO Switch	Station 5	Senses when the projectile lift cylinder is extended/retracted.
45-1-503A/B 1&2	NAMCO Switch	Station 5	Senses when the carriage cylinder is extended/retracted.
45-1-504A/B 1&2	NAMCO Switch	Station 5	Senses when the pull cylinder is extended/retracted.
45-1-504C*	Proximity Detector	Station 5	Senses burster well when pulled.
45-1-505A/B	NAMCO Switch	Station 5	Senses when the collet set cylinder is extended/retracted.
45-1-505C	NAMCO Switch	Station 5	Senses when the collet is set in the burster well.
45-1-506A/B	NAMCO Switch	Station 5	Senses when the drip pan cylinder (pull Station) is extended/retracted.
45-1-507A/B	NAMCO Switch	Station 5	Senses when the burster well chute cylinder is extended/retracted.
45-1-509A/B	NAMCO Switch	Station 5	Senses when the drip pan cylinder (Drain Station) is extended/retracted.
45-1-510A/B*	NAMCO Switch	Station 5	Senses when the drain tube cylinder is extended/retracted.
45-1-510C*	Proximity Sensor	Station 5	Senses when the drain tube is at the bottom of the munition.
45-1-601A/B	NAMCO Switch	Station 6	Senses when the projectile slide cylinder #6 is extended/retracted.
45-1-602A/B	NAMCO Switch	Station 6	Senses when the burster well lift cylinder is extended/retracted.

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS

Sensor Tag[a]	Sensor Type	Location of Sensor	Functional Description
45-1-603A/B	NAMCO Switch	Station 6	Senses when the collet set cylinder is extended/retracted.
45-1-603C	Pressure Switch	Station 6	Senses when the collet is set in the burster well.
45-1-604A/B	NAMCO Switch	Station 6	Senses when the burster well crimp cylinder is extended/retracted.

Notes:
[a] Sensor tags are identical for all three MDMs and PPMs except for the second number which is "2" or "3" for MDM-102 and MDM-103, respectively.
LUS = Load/Unload Station
MDM = Multipurpose Demilitarization Machine
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

Table 14-5-2
MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE CRITICAL SENSORS AND INTERLOCKS

Sensor Tag	Sensor Type	Functional Description	Interlock
45-10-25-154	Proximity Detector	Senses munition tray at Line A, MDM-101	Conveyor MDM-CNVP-101
45-10-25-170	Proximity Detector	Senses munition tray at Line A, MDM-102	Conveyor MDM-CNVP-103
45-10-25-160	Proximity Detector	Senses munition tray at Line A, MDM-103	Conveyor MDM-CNVP-105
45-10-25-254	Proximity Detector	Senses munition tray at Line B, MDM-101	Conveyor MDM-CNVP-102
45-10-25-270	Proximity Detector	Senses munition tray at Line B, MDM-102	Conveyor MDM-CNVP-104
45-10-25-260	Proximity Detector	Senses munition tray at Line B, MDM-103	Conveyor MDM-CNVP-106

Table 14-6-1 SUMMARY OF MINE MACHINE SENSORS (ECR B)		
Sensor Tag	**Sensor Type**	**Functional Description**
03-ZS-201A	NAMCO	Senses swing roller is up
03-ZS-201B	NAMCO	Senses swing roller is down
44-ZS-103	RETROREFLECTIVE	Senses mine is present on MHS-MIN-101
44-ZS-415A	NAMCO	Senses ECR index stop is raised
44-ZS-415B	NAMCO	Senses ECR index stop is lowered
44-ZS-416A	NAMCO	Senses ECR feed stop is raised
44-ZS-416B	NAMCO	Senses ECR feed stop is lowered
44-ZS-417A	NAMCO	Senses MCC verification is extended
44-ZS-417B	NAMCO	Senses MCC verification is retracted
44-ZS-418	RETROREFLECTIVE	Senses mine is present at ECR index stop
44-ZS-419	FIBEROPTIC	Senses mine is present at ECR feed stop
03-ZS-223A	NAMCO	Senses MIN-GATE-102 is raised
03-ZS-223B	NAMCO	Senses MIN-GATE-102 is lowered
44-I1-PLS-13	FIBEROPTIC	Senses mine or MCC is pushed out to DFS
44-I1-PLS-1	MAGNETIC	Senses metal mine is staged
44-I1-PLS-2*	MAGNETIC	Senses mine is oriented correctly
44-I1-PLS-4	MAGNETIC	Senses yoke rotator is in home position
44-I1-PLS-5	MAGNETIC	Senses yoke is in vertical position
44-I1-PLS-6	MAGNETIC	Senses yoke rotator is in discharge position
44-I1-PLS-7	MAGNETIC	Senses trolley cylinder is retracted
44-I1-PLS-8	MAGNETIC	Senses trolley cylinder is extended
44-I1-PLS-9	FIBEROPTIC	Senses that mine is at FARS station
44-I1-PLS-10	MAGNETIC	Senses trolley is at mid position
44-I1-PLS-11	FIBEROPTIC	Senses mine in in yoke discharge position
44-I1-PLS-12	FIBEROPTIC	Senses mine is in yoke
44-ZS-102A	NAMCO	Senses orientation station cylinder is raised
44-ZS-102B	NAMCO	Sense orientation station cylinder is lowered
44-ZS-104A	NAMCO	Senses yoke stop cylinder is open
44-ZS-104B	NAMCO	Senses yoke stop cylinder is closed
44-ZS-106A	NAMCO	Senses FARS cylinder is lowered
44-ZS-106B	NAMCO	Senses FARS cylinder is raised
44-ZS-107A*	NAMCO	Senses drain/punch cylinder is extended
44-ZS-107B	NAMCO	Senses drain/punch cylinder is retracted
44-ZS-108A*	NAMCO	Senses clamp cylinder is extended
44-ZS-108B	NAMCO	Senses clamp cylinder is retracted
03-ZS-9001	RETROREFLECTIVE	Senses mine is at ECR staging position
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.		